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Incentives in Education and Marriage

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Incentives in Education and Marriage

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DISSERTATION

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT AUSTIN

May 2008

To Gülṣan Gevrek, my great grandmother,

Naciye Çakiroḡlu, my mother, and

Orhan Gevrek, my father.

Acknowledgments

I would like to thank my dissertation supervisors Dr. Daniel S. Hamermesh and Dr. Stephen J. Trejo for their untiring support and guidance. I would also like to thank the other members of my dissertation committee Dr. Stephen Donald, Dr. Gerald S. Oettinger, and Dr. Arthur Sakamoto.

I am forever indebted to my sister, Zahide Eylem Gevrek, who supported and encouraged me throughout graduate school. Our discussions led to the joint work that became the second chapter of this dissertation. I am thankful to the participants of the seminars at the University of Texas at Austin for their invaluable insights. Thanks also to all my friends at the University of Texas at Austin for making graduate school a pleasant experience. Special thanks to Anne Marie Jennings for her help in editing.

I am thankful to Gülşan Gevrek, my great grandmother, who forced my parents to have one more child, and that was me. I have the best family in the universe. For that, I would like to thank my mother Naciye Çakiroğlu and my father Orhan Gevrek for having me and raising me in an intellectually stimulating family. I am indebted to my twin sisters, Gülşen Sevi and Zahide Eylem Gevrek, for giving me a very hard time during my childhood, which surely made me a strong person and prepared me for life. Finally, I am eternally thankful to my husband Antonio for making me the happiest person. Without his support, I would not have been able to finish this dissertation.

Incentives in Education and Marriage

Publication No. _____

Deniz Gevrek, Ph.D.
The University of Texas at Austin, 2008

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Choices pertaining to education, marriage and migration generally have profound impacts on individuals' lives. This dissertation focuses on the role of incentives in decisions involving education, interracial marriage and migration. To this end, Chapter 2 initiates a new line of research that investigates the role of self-employed parents on their children's post-graduation plans and college success. Chapter 2 reveals that self-employed parents affect their offspring's college success even after accounting for possible ability bias and controlling for various individual characteristics. While Chapter 2 focuses on the role of parental occupation on students' incentives to succeed in college, Chapter 3 and Chapter 4 investigate intricate relationships among education, interracial marriage, the anti-miscegenation laws, and migration in the U.S. Chapter 3 introduces a study that links previous literatures on the migration of blacks in the U.S. during the Great Migration with anti-miscegenation laws and interracial marriage. Chapter 3 concludes that anti-miscegenation laws in individuals' states of birth affected the sorting of inter- and intraracially married

black males into destination states differentially. Chapter 4 contributes to the previous literature on the determinants of black-white marriages by focusing on the impact of geographical variation of the distributions of black and white education and individual education on interracial marriage.

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Chapter 1

Introduction

In economics, the assumption of utility maximization, which entails attaining the highest level of satisfaction given one's constraints, is widely used to explain an individual's behavior and choices. While the resource/budget constraint is the most commonly used form of limitation on individual's actions, economic constraints may also involve social constraints. Family, educational institutions and statutes are among the most important elements that define an individual's environment and social constraints. This dissertation investigates choices regarding human capital accumulation, marriage and migration by incorporating social constraints.

These three chapters extend the literature on the determinants of college success, black/white interracial marriage and migration by exploring new directions and providing novel answers to old questions. Although each chapter focuses on a different aspect of individual behavior, they all investigate the power of incentives shaped by one's social environment.

Within the organization of a family, parents generally perform an important role in molding their offspring's behavior. Chapter 2 initiates a line of research that explores the impact of parental occupational choices on their off-

spring's educational outcomes. Chapter 2 is based on a joint work with Zahide Eylem Gevrek. It examines the role of self-employed parents on their children's post-graduation plans and college success. We examine the influence of family businesses and self-employed parents on the incentives to succeed in college. Betts and Morell (1999) and Irandoust and Karlsson (2002) find that college success is correlated with factors including individual and family characteristics, social background and individual discipline. None of the previous studies considers nepotism, family businesses and self-employed parents as factors affecting students' incentives to exert effort in college. Having a family business implies a larger set of post-graduation opportunities for a college student, and it may affect the incentives to acquire a high GPA in college.

We use a unique data set from a private university in Turkey. The data set is assembled by matching college students' administrative records with their responses to a survey designed and administered by the authors. This rich data set has information on personal and family characteristics including college GPA, scholarship status, post-graduation plans, number of younger and older siblings, family income, gender, age, year in college, the Turkish Central University Entrance Exam score or the Student Selection Examination (SSE) score, college major, parental education and occupations, and family business characteristics.

We suggest a theoretical framework that generates empirically testable hypotheses and test them using various empirical methods. Our findings show that family businesses and self-employed parents have a strong negative effect

on college students' GPAs, after controlling for demographic characteristics, ability, college major, and parental education.

College GPAs of male students with two self-employed parents or only a self-employed mother are the lowest, even after controlling for ability bias. The impact of self-employed parents on female students' GPAs is similar to that on male students' GPAs, except in the category of female students having only a self-employed mother, for whom parental self-employment has a positive impact on GPA.

By using the surveyed sample and accounting for possible survey non-response bias, our results show that the children of self-employed parents are more likely to have entrepreneurial post-graduation plans. The impact of having only a self-employed father on future self-employment plans is large, while the impact on entrepreneurial intent of having two self-employed parents is even larger. Students with self-employed parents are not only more likely to plan to be entrepreneurs, but they are less likely to plan to attend to graduate school. Chapter 2 explores the limits of nepotism, parental self-employment and family businesses on their offspring's behavior, and it concludes that parents not only affect post-graduation plans, but may also have a negative impact on students' college success.

Maintaining good relations in a multiracial society depends on the extent to which different racial groups interact. One important aspect of these racial interactions is interracial marriages, which work by blurring, if not removing, racial lines in a society. Chapter 3 initiates a new line of research by

investigating the role of anti-miscegenation laws on interracially married black males' migration patterns during the Great Migration in the United States. Chapter 4 on the other hand focuses on the role of educational attainment on black male/white female interracial marriages.

From the 1910s to the 1970s millions of southern-born blacks migrated to the West and to the North. This Great Migration caused a drastic change in the geographical distribution of the black population (see Fligstein [1981], Marks [1989], Goodwin [1990], Lemann [1991], Trotter [1991] and Tolnay, and Crowden and Adelman [2002]). In order to understand the intricate relationship between statutes banning interracial marriage and black male migration patterns, this study models the destination choices of married black males by using a multinomial probit model.

I find that anti-miscegenation laws in individuals' states of birth affected the migration of inter- and intraracially married black males differentially. I use triple differencing to test whether the generation of black males who were not constrained by anti-miscegenation laws while in the marriage market sorted themselves differently into destination state groups than those black males who were constrained by those laws. I find that the younger generation of married black males who experienced a marriage market free of anti-miscegenation laws had different migration patterns than the older generation of married black males. Chapter 3 reveals that the U.S. Supreme Court decision in the case of *Loving v. Virginia* in 1967, which forced the last 16 Southern states to strike down their anti-miscegenation laws, affected the

destination selection of married black males.

Chapter 4 investigates the role of human capital on black male/white female interracial marriages. Specifically, it attempts to identify the channels through which education operates in the marriage market. I use a two-sided matching model with *ex ante* heterogeneous agents. The model focuses on the role of different black and white education distributions on the Interracial Marriage Probability (IMP), and it has implications for the relative importance of racial adaptability and assortative mating effects of human capital on exogamy (interracial marriage). The results show that individual human capital is important in explaining the probability of interracial marriages. The main contribution of this paper, however, is to reveal the importance of spatial differences in black and white education distributions in affecting the black male IMP. The empirical implications of this model are tested by using the 5 percent sample of the Integrated Public Use Microdata Series (IPUMS) of the 2000 U.S. Census Data.

Chapter 2

Nepotism, Incentives and the Academic Success of College Students

This study examines the effects of family businesses and nepotism on the incentives to succeed in college. Previous studies indicate that college success, measured by GPA, is correlated with factors including individual and family characteristics, social background and individual discipline (e.g., Betts and Morell [1999]; Irandoust and Karlsson [2002]). None, however, consider nepotism, family businesses and self-employed parents as factors affecting students' incentives to exert effort in college. The possibility of employment in a family business implies a larger set of post-graduation opportunities for a college student, and it may affect the incentives to acquire a high GPA in college.

According to human capital theory, additional years of education acquired by attending college add valuable skills to the stock of human capital and increase productivity. As per signalling theory (Spence [1974]), a college diploma may not add to individual productivity but has an informational value by providing a signal for innate ability. Either theory can explain the behavior of a high school senior, without the safety net of a family business, choosing to

go to college. Students with family businesses may also choose to enroll in college to insure themselves against the future uncertainty of relative returns to different post-graduation plans. Regardless of a larger set of post-graduation employment options, a rational individual may choose to enroll in college.

When a job requires at least a college degree, years of schooling may lose their signalling and human capital values for the pool of college graduates. In this case, employers may focus on other information, such as GPA.[1] College GPA may affect a student's probability of finding a job irrespective of signalling ability or acting as a proxy for human capital. Moreover, it is well established that college GPA may affect earnings.[2]

The existence of a family business may affect incentives to succeed in college in two ways. First, students with family businesses may choose to exert more effort in college and accumulate human capital, because they are more likely to be the residual claimants on returns to skills in their respective businesses if they choose to work in the family business or in a new business.[3] Furthermore, they may exert greater effort in college because they value the non-monetary success of their business (either family or a new one) more

[1]For instance, in the `http://www.usajobs.gov/`, USJOBS website - the federal government's official one-step source of jobs and employment information - the applicants are asked to report their college GPAs.

[2]Extensive literature substantiates the impact of college GPA and college class rank on post-graduation earnings (e.g., Weisbrod and Karpoff [1968], Wise [1978], James et al. [1989], Ehrenberg and Sherman [1999] and Hamermesh and Donald [2008]).

[3]The intergenerational links in self-employment are very strong. The research on intergenerational transfer of self-employment finds that the children of self-employed fathers are more likely to become self-employed (e.g., Lentz and Laband [1990], Dunn and Holtz-Eakin [2000] and Hout and Rosen [2000]).

than the non-monetary success of a non-family business by which they were employed.

On the other hand, students with family businesses may exert less effort in college if they anticipate a secure job and earnings in the family business regardless of their college success. This may be true because a family may have a better idea about its offspring's ability than other potential employers, hence the signalling value of the college GPA becomes unimportant. Also, the family may simply favor its members over other individuals. Besides, aspiring entrepreneurs with family businesses may put more emphasis on managerial and industry specific human capital obtained through work experience than on task-specific career-oriented human capital acquired in college.[4]

Recent research on nepotism and firm performance shows that nepotism may be an important issue in the U.S. economy. Perez-Gonzalez (2006), using data from the chief executive officer (CEO) successions of publicly traded U.S. corporations, calculates that 36.4 percent of the these firms' CEO successions involved nepotism. The firms that promote related CEOs significantly underperform compared to those that promote unrelated CEOs.[5] Also, family CEOs who attended selective colleges perform better than CEOs who did

[4]Lentz and Laband (1990) distinguish between the general occupational skills acquired via college education and job specific skills or managerial human capital acquired by experience. Lazear (2004) finds that among Stanford MBA alumni, the entrepreneurs study a more varied curriculum in the program compared to those who work as employees.

[5]Bennedsen et al. (2007), find a negative impact of related CEOs on the performance of Danish firms.

not.[6] A high GPA, regardless of whether it has a signal value or adds to human capital, strongly predicts future productivity reflected in wages earned as an employee or in the performance of a business. The reason behind lower performance of related CEOs could be the effort made while in school due to different post-graduation plans, which previous studies have not controlled.

To analyze the impact of nepotism, family businesses and self-employed parents on the incentives to succeed in college, we use a unique data set that is constructed by matching information from two different sources. The first part comes from a survey conducted in December 2006.[7] We surveyed students in the College of Economics and Administrative Sciences at a major private university in Turkey. The second part of the data set comes from the confidential administrative records of the university. Matching the survey data with students' administrative records would have been impossible in the United States due to different privacy regulations.

This study initiates an effort to understand the role of incentives shaped by self-employed parents and post-graduation employment opportunities in college success. Also our work suggests that if family businesses employ relatives with lower levels of human capital, they may incur non-market costs and put themselves in a less competitive position compared to non-family businesses. Favoritism of this kind may affect the health and success of these

[6]The author defines a selective college as an undergraduate institution that is classified as very competitive or better in Barron's, 1980, profiles.

[7]See Appendix A for the questionnaire.

businesses and the economy. This implication is closely related to and consistent with favoritism and firm performance literature.

The empirical findings suggest that family businesses and self-employed parents have a strong negative effect on college students' GPAs, after controlling for demographic characteristics, ability, college major, and parental education. GPAs of male students with two self-employed parents or only a self-employed mother are the lowest, even after controlling for ability bias. The impact of self-employed parents on female students' GPAs is similar to that on male students' GPAs, except in the category of female students having only a self-employed mother, for whom parental self-employment has a positive impact on students' GPAs. By using the surveyed sample and accounting for possible survey non-response bias, we find that the children of self-employed parents are more likely to have entrepreneurial post-graduation plans. The impact of having only a self-employed father on future self-employment plans is large, while the impact on entrepreneurial intent of having two self-employed parents is even larger. Students with self-employed parents are not only more likely plan to be entrepreneurs, but they are less likely to plan to attend to graduate school.

2.1 Theoretical Model

The objective of this theoretical framework is to understand how the presence of family businesses may affect students' effort and success in college. After enrolling in college, individuals choose the level of effort to exert in

classes. A student who studies harder is more likely to get a higher GPA than an otherwise identical student. For simplicity, we assume that a student with no family business may choose to work as an employee after graduation.

College students with family businesses face a larger set of choices upon graduation. They may choose to work as employees or to work in their respective family businesses. The literature on the intergenerational transfer of self-employment suggests that students with family businesses are more likely to become self-employed upon graduation than those who do not have family businesses. The literature suggests two possible explanations for this phenomenon. First, in the presence of capital market imperfections, successful entrepreneurs may relax the capital market constraints on their offspring by transferring their wealth (Dunn and Holtz-Eakin [2000]). Second, intergenerational transfer of self-employment may result from parents' passing work experience, managerial human capital and industry-specific knowledge on to their children.

Students who plan to be self-employed may not prioritize college success as mentioned before. Given time constraints, aspiring entrepreneurs have to allocate their time between leisure, studying for college classes and augmenting their managerial and industry-specific human capital by interning and by doing part time or voluntary work.

The costs of acquiring managerial and industry-specific human capital and work experience are likely to be lower for a student with a family business, because she may have better access to business experience. In this case, future

entrepreneurs may choose to make less effort in college simply because of time constraints, different relative returns to college success and the possibility of a lower relative cost of acquiring managerial business-specific human capital.

The next section sets up the environment for a stylized model. Here, we do not consider the human capital investment at the extensive margin. Human capital is not measured by the number of years of schooling; rather we consider it at the intensive margin by measuring the level of effort, which, in turn, determines a student's GPA.

2.1.1 Environment

After enrolling in college, students make their post-graduation employment plans in the first period. For simplicity, we do not consider time discounting. The students may choose to work as employees or become self-employed by working for their respective family businesses once they graduate from college during the second period. Utility, defined as $U(y_i, l_i) = \alpha_1 lny_i + \alpha_2 lnl_i$, is a function of y_i, the earnings in the second period and l_i, the leisure choice made in the first period. The parameters α_1 and α_2 measure the relative consumption/leisure preference.

If a student chooses to be an employee, she maximizes her utility to determine l_i and y_i. The output is a function of e_i, the effort spent on acquiring task-specific and career-oriented human capital that is taught in college. If she chooses to work for the family business, in addition to determining l_i and e_i, she picks out the level of m_i, effort spent on managerial and industry-specific

human capital. The effort costs of e_i and m_i are measured in units of time.

The total time available to a student while in college is T. The time spent on investing different types of human capital and leisure must satisfy the constraint $e_i + l_i \leq T$ for an employee and $e_i + m_i + l_i \leq T$ for a self-employed person. In the second period, the students supply one unit of labor inelastically.

The earnings, w_i, as an employee depend on μ_i, which captures the effect of personal characteristics (e.g., race, marital status, gender, physical appearance) and college grade point average. $GPA_i = e_i^{\beta_i}\epsilon$ is a function of e_i and ϵ.[8] Individual specific β_i shifts the production function for college GPA and captures individual ability. The output of an employee is $w_i(GPA_i, \mu_i) = GPA_i\mu_i$. The utility of a future employee is given by $U(y_i, l_i) = \alpha_1 ln(e_i^{\beta_i}\epsilon\mu_i) + \alpha_2 lnl_i$.

The earnings of a self-employed person are $f(GPA_i, mi, \mu_i) = GPA_i[m_i (1 + \psi_i)]^{\theta_i}\mu_i$, which is a function of college GPA_i, effort spent on managerial industry-specific human capital m_i, and personal characteristics μ_i. The parameter θ_i reflects the ability of an individual as an entrepreneur and the ease with which one can obtain managerial expertise, reputation or industry-specific knowledge. The parameter $\psi_i \in [0, 1)$ measures the extent of favoritism. If $\psi_i \in (0, 1)$, there is nepotism in the sense that the contribution of m_i is overvalued by the family. The parameter $\psi_i = 0$ if there is no nepotism involved. The

[8] ϵ is a random element with a mean of one and a finite variance.

utility of a future entrepreneur is $U(y_i, l_i) = \alpha_1 ln\{e_i^{\beta_i}\epsilon[m_i(1+\psi_i)]^{\theta_i}\mu_i\}+\alpha_2 lnl_i$.

We focus on the role of future employment decisions and the impact of family businesses on the optimal e_i. A student who will work as an employee chooses e_i and l_i to maximize her utility $U(y_i, l_i) = \alpha_1 ln(e_i^{\beta_i}\epsilon\mu_i) + \alpha_2 lnl_i$, subject to the time constraint $e_i + l_i \leq T$. The optimal solution to this constrained maximization problem is:

$$e_i^* = \frac{\alpha_1\beta_i T}{\alpha_1\beta_i + \alpha_2} \tag{2.1}$$

$$l_i^* = \frac{\alpha_2 T}{\alpha_1\beta_i + \alpha_2}. \tag{2.2}$$

The optimal effort level e_i^* of a future employee is increasing in the parameters α_1, β_i; and it is decreasing in α_2.

Conditional on choosing to be self-employed after graduation, a student determines the level of m_i, as well as e_i and l_i to maximize her utility, $U(y_i, l_i) = \alpha_1 ln\{e_i^{\beta_i}\epsilon[m_i(1+\psi_i)]^{\theta_i}\mu_i\} + \alpha_2 lnl_i$, subject to the time constraint $e_i+m_i+l_i \leq T$. The solution to this constrained maximization problem yields optimal e_i^{**}, m_i^{**}, and l_i^{**}:

$$e_i^{**} = \frac{\alpha_1\beta_i T}{\alpha_1\beta_i + \alpha_1\theta_i + \alpha_2} \tag{2.3}$$

$$m_i^{**} = \frac{\alpha_1\theta_i T}{\alpha_1\beta_i + \alpha_1\theta_i + \alpha_2} \tag{2.4}$$

$$l_i^{**} = \frac{\alpha_2 T}{\alpha_1\beta_i + \alpha_1\theta_i + \alpha_2}. \tag{2.5}$$

Similar to the previous case, a future entrepreneur's optimal effort exerted in college, e_i^{**} is increasing in α_1 and β_i and is decreasing in α_2. Regard-

less of their post-graduation plans, students with higher β_i spend more time on e_i.

Unlike when a student chooses to be an employee, a future employer's e_i^{**} is decreasing whereas m_i^{**} is increasing in θ_i. The students who have higher entrepreneurial ability and better access to industry-specific managerial human capital (high θ_i) will exert a lower effort (e_i^{**}) in school, and they will put a higher emphasis on acquiring managerial human capital (m_i^{**}). As shown in equations (2.1) and (2.3), the optimal effort exerted in college classes for future entrepreneurs and future employees are not identical. Comparing two otherwise identical students, the one that opts for self-employment will exert a lower effort in college than the one who chooses to be an employee ($e_i^* = \frac{\alpha_1\beta_i T}{\alpha_1\beta_i+\alpha_2} > e_i^{**} = \frac{\alpha_1\beta_i T}{\alpha_1\beta_i+\alpha_1\theta_i+\alpha_2}$).

So far, we have considered the effort and leisure choices conditional on making post-graduation plans. Now, we turn our attention to the factors affecting post-graduation employment decisions. The utility from being an employee is $U(y_i^*, l_i^*) = \alpha_1 ln[(e_i^*)^{\beta_i}\epsilon\mu_i] + \alpha_2 lnl_i^*$, and the utility from self-employment is $U(y_i^{**}, l_i^{**}) = \alpha_1 ln\{(e_i^{**})^{\beta_i}\epsilon[m_i^{**}(1+\psi_i)]^{\theta_i}\mu_i\}+\alpha_2 lnl_i^{**}$. A student opts for self-employment if the expected utility is higher, that is if:

$$\alpha_1 ln\{(e_i^{**})^{\beta_i}\epsilon[m_i^{**}(1+\psi_i)]^{\theta_i}\mu_i\} + \alpha_2 lnl_i^{**} > \alpha_1 ln[(e_i^*)^{\beta_i}\epsilon\mu_i] + \alpha_2 lnl_i^*. \quad (2.6)$$

The inequality indicates that entrepreneurial intent depends not only on μ_i, and θ_i, but also on nepotism, ψ_i. Also, in the presence of nepotism, i.e. $\psi_i \in (0, 1)$, the left side of the above inequality increases in ψ_i. As a result,

students are more likely to become self-employed upon graduation.

The model gives two empirically testable hypotheses. First, the offspring of self-employed parents are more likely to become self-employed. Second, students with self-employed parents are expected to have on average lower GPAs, because they are more likely to become self-employed after graduation.

2.2 Data Set

The empirical analysis in this study relies on two data sources. The first part comes from the in-class survey we designed and administered to the students at the College of Economics and Administrative Sciences of a private university in Turkey.[9] In-class surveys were conducted in December 2006, spanning a period of three weeks. In order to improve the survey, we pre-tested the initial version on a group of 20 students from another college in the same university. The final version of the survey questionnaire was produced by taking into account those students' answers and suggestions. After this the students of the College of Economics and Administrative Sciences answered detailed questions about their personal and family characteristics, GPA, scholarship status, post-graduation plans, number of younger and older siblings, and family business characteristics if applicable.

The second piece of information comes from administrative data on all

[9]The College of Economics and Managerial Sciences offers the following majors: Economics, Economics (Honors), Business Administration, Business Administration-Economics, Business Administration-Economics (Honors), Government, International Relations and International Finance.

sophomore, junior and senior students in the same college.[10] We are able to match the surveyed individuals with their administrative records. The administrative data contain detailed information on each student's GPA, gender, age, year in college, the Turkish Central University Entrance Exam score or the Student Selection Examination (SSE) score, major, scholarship status, parents' education levels and occupations.

Of the 1,122 sophomore, junior and senior students in the College of Economics and Administrative Sciences, we were able to survey 499 (44.47 percent). The non-surveyed sample consists of the students who failed to attend class on the day of the survey. We believe that the probability of surveying a student may depend on a student's course load along with other determinants of attendance such as the weather and idiosyncratic shocks. Therefore, the students with heavier course loads are expected to be more likely to appear in our surveyed sample, because they are more likely to be present in a greater number of classes compared to those with lighter course loads. The item non-response rate among the surveyed students was very low, since we monitored students closely and insisted that they respond to as many questions as possible.

Summary statistics for the entire sample (1,122), surveyed (499) and non-surveyed (623) samples are presented in Table 2.1. The first row shows that the surveyed students have higher cumulative GPAs on a four-point scale.

[10]The freshmen students are excluded from the sample since their GPAs were not reported by December 2006.

Consistent with expectations, the surveyed students take more classes (6.12 per semester) compared to others (5.88 per semester). The surveyed students are slightly younger, and there are many more female students in the sample of respondents. The surveyed students, on average, have higher SSE scores. The education distributions of their parents are similar for surveyed and non-surveyed students. The average educational attainment of mothers is 11.55 years, while the average educational attainment for fathers is higher 13.37 years.

Seventy-four percent of mothers are either housewives, unemployed or retired. This percentage is consistent with the 25.5 percent labor force participation rate reported by the State Institute of Statistics based on the 2000 Turkish Household Labor Force Survey.

The distributions of parental occupations for the entire sample suggest that almost 45 percent of the fathers and 6 percent of the mothers are non-professional self-employed individuals.[11] Having a self-employed parent does not necessarily imply that the family owns a business. A family business requires having employees other than self-employed parents. However, out of 191 surveyed students who have self-employed fathers, only 4 of them reported that their self-employed fathers are the only workers in their businesses. The rest of these 191 students reported that their family businesses employed anywhere from 2 to 1,000 people. Out of these 191 students, 103 of their

[11]The self-employed category does not include the professionals such as doctors, lawyers, consultants, and accountants among others.

self-employed parents do not employ non-family members at the management level. Students with two self-employed parents and only self-employed mothers reported similar family business structures and self-employment patterns to those with only self-employed fathers.

Tansel (2001) calculates more recent figures for occupational distributions classified by urban and rural residence, based on the 2000 Turkish Household Labor Force Survey. Self-employed males make up 27 and 50 percent of the urban and rural labor forces respectively, while self-employed females make up 5 and 14 percent of the urban and rural labor forces, respectively. The occupational distributions of the parents in our sample are similar to those of males and females in Turkey based on the calculations from Census and Household Survey data sets.

U.S. self-employment rates are somewhat different from the ones in our sample. For instance Fairlie (1999) calculates that the U.S. self-employment rate for whites is 15.23 percent. Hout and Rosen (2000), report a 24.2 percent self-employment rate for fathers, while Dunn and Holtz-Eakin (2000) find that the overall propensities for self-employment for fathers and mothers are 30 percent and 9 percent, respectively.

Table 2.1 shows the distribution of post-graduation plans for the surveyed students. Sixteen percent of the students plan to work in their family businesses, and 4 percent are planning to start a new business. We consider these two groups of students who are planning to be self-employed directly after graduation as "first-degree entrepreneurs". Twenty percent of the surveyed

students said that they are planning to work as employees, while 7 and 17 percent of them said that their post-graduation plans involve either "working as employees first, and then working for their family businesses," or "working as employees first, and then starting a new business," respectively. We regard the students who are planning to "work as employees first and then become self-employed" as "second-degree entrepreneurs." Thirty-three percent said that they are planning to go to graduate school and 3 percent said that they have other plans.

Table 2.2 shows the mother-father matched parental occupation distributions for the entire sample and the surveyed sample. The upper panel of Table 2.2 shows that out of 1,122 students, 499 have non-professional self-employed fathers, while only 64 have non-professional self-employed mothers. Forty-six students reported having two non-professional self-employed parents. The most common type of couple is the housewife/non-working mother and non-professional self-employed father. The lower panel shows that out of 499 surveyed students, 191 and 28 have non-professional self-employed fathers and mothers, respectively.

2.2.1 The Turkish Educational System

In Turkey the only gateway to enter college is the Student Selection Exam (SSE). The SSE is conducted every year in mid-June.[12] In 2006, the

[12]See the detailed information on SSE from this link, "`http://www.osym.gov.tr/BelgeGoster.aspx?F6E10F8892433CFF7A2395174CFB32E15F640FC6104C033D`."

number of students who took the test was 1,570,357. Public universities had 163,844 spots, while private universities had 24,045 spots. Only 156,120 students enrolled in public universities and 16,111 enrolled in private universities. The SSE has questions that test knowledge of high school curricula and students' verbal, quantitative and analytical reasoning abilities.[13]

The composite SSE scores are based on students' performance on the test and their cumulative high school GPAs. The Turkish Student Placement Center states that the SSE has two objectives. They are: a) to assure a balance between the demand for higher education and the number of spots available in higher education institutions, and b) to select and place students with the highest probability of success in appropriate higher education programs by considering their preferences and performance on SSE. The SSE score is well accepted in Turkey as a good proxy for a student's ability post-high school graduation.

In Turkey, public and private universities differ, especially in tuition and other fees. Public university tuition costs for academic year 2006-2007 vary between $82 and $682, while private university tuition is approximately $10,600 per year. The private university involved in the current study accepts two groups of students. The first group consists of those who perform well on

[13]The Turkish Student Placement Center, the government agency that administers the SSE, describes the verbal parts of the SSE's content as "proficiency in the Turkish language, and the ability to reason, using social science concepts and generalizations," while "the major components of the quantitative parts of the tests are the ability to make use of basic mathematical concepts and rules and ability to reason, using natural science concepts and generalizations."

the SSE and earn an Education Ministry Scholarship. This scholarship pays for all tuition and school fees regardless of success in college. The second group is composed of those who score significantly lower than the first group and pay for their own tuition and school expenses. The University Board of Trustees awards students in the second group who earn and sustain the highest GPAs in their majors and cohort a University Merit Scholarship.

2.3 Empirical Framework and Results

The productivity of a self-employed person depends not only on the level of task-specific and career-oriented human capital, but also on managerial and industry-specific human capital. Children of self-employed parents are expected to have easier access to managerial and industry-specific human capital, and their productivity as entrepreneurs may be higher. The first empirically testable hypothesis implied by the model and the literature on intergenerational transfer of self-employment is that offspring of self-employed parents are more likely to become self-employed. The second hypothesis is that students with self-employed parents are expected to have lower GPAs on average, because they are more likely plan to be self-employed after graduation. In this section we test these two hypotheses. Not only do we try to quantify the impact of family businesses, but we also try to understand the effects of different business ownership structures on the academic success of

college students. The empirical model is given by:

$$GPA_i = X_i'\delta_0 + \delta_1 SE_{father\ only} + \delta_2 SE_{mother\ only} + \delta_3 SE_{both\ parents} + \beta_1(F \times SE_{father\ only}) + \beta_2(F \times SE_{mother\ only}) + \beta_3(F \times SE_{both\ parents}) + \epsilon_i \quad (2.7)$$

where i indexes students.

The dependent variable is the cumulative college GPA as of November 2006. The indicator variables, $SE_{father\ only}$, $SE_{mother\ only}$ and $SE_{both\ parents}$, take on a value of one if only the father or only the mother or both parents are non-professional self-employed individuals.[14] In order to see if self-employed parents have differential effects on their sons' and daughters' GPAs, we include an indicator variable for female students and its interaction with $SE_{father\ only}$, $SE_{mother\ only}$ and $SE_{both\ parents}$. If parental self-employment has a negative effect on male students' GPAs, the estimates of the coefficients δ_1, δ_2, and δ_3 are expected to be negative and statistically significant. If the self-employment experiences of the parents have different effects on male and female students, the coefficients of the interaction terms are expected to be statistically significant.

The explanatory variable set in equation (2.7) contains X_i, which is the vector of demographic, individual and parental characteristics, and ϵ_i, the error term. If parents of students with low GPAs took the unlikely path of becoming self-employed to secure the future of their offspring, then the

[14]The omitted group is the students without any self-employed parents.

indicator variables for parental self-employment, $SE_{father\ only}$, $SE_{mother\ only}$, $SE_{both\ parents}$, and the interaction terms are potentially endogenous to the GPA equation. In this case, the estimates of δ_1, δ_2, δ_3, β_1, β_2, and β_3 are biased and inconsistent. We believe that reverse causality of this kind is highly unlikely, because parents generally make their occupational choices much before than their children are enrolled in college.

Unobserved ability bias arises if the occupational choices of parents and parental ability, which is expected to be highly correlated with the offspring's ability, are correlated. More specifically, if high-ability parents are less likely to be self-employed, the negative coefficients for the presence of self-employed parents are downward biased, and vice-versa. We tackle this issue by including two proxy variables for unobserved ability, the SSE scores of students and variables measuring parental education levels.

2.3.1 Impact of Self-Employed Parents on College Success

Table 2.3 shows the estimation results of equation (2.7) for three alternative specifications. Each specification adds more controls to the set of explanatory variables. In the first we include gender, age, hours studied, family income, self-employed parents, and female and self-employed parents interaction variables.[15] Column 1 reveals that the impact of having only a self-employed (non-professional) father on a male student's GPA is estimated

[15]Data on family income and number of hours spent studying are available for surveyed students only. We included two indicator variables for the missing responses of the non-surveyed students.

to be -0.19 and is highly significant.[16] The impact of having only a self-employed mother on a male student's GPA is -0.35 and is significant at the one percent level. The GPAs of male students with two self-employed parents are on average 0.47 points lower than those of male students with no self-employed parents.

The F-test rejects the equality of the impact of different parental self-employment types for male students, i.e. $H_0 : SE_{father\ only} = SE_{mother\ only} = SE_{both\ parents}$ is rejected. Having two self-employed parents or having only a self-employed mother has the strongest negative impact on male students' GPAs, implying that the different self-employment statuses of parents differently influence male students' college success.

The GPAs of female students with no self-employed parents are on average 0.15 points higher (significant at the one percent level) than those of male students with no self-employed parents. Column 1 shows that the coefficients of $(F \times SE_{father\ only})$, $(F \times SE_{mother\ only})$ and $(F \times SE_{both\ parents})$ are not statistically significant. This implies that on average the self-employed status of parents does not differentially affect their sons' and daughters' college GPAs, when we do not account for possible ability bias.

Column 2 of Table 2.3 shows the estimation results after augmenting the first specification with the SSE score (a proxy for ability), indicator variables for the year of enrollment or test year, the SSE score and test year

[16] College GPA is measured out of a maximum of 4 points.

interactions, and seven indicator variables for college major.[17] The coefficients of $SE_{father\ only}$, $SE_{mother\ only}$, and $SE_{both\ parents}$ are -0.10, -0.23 and -0.30, respectively. The statistically significant yet weaker negative coefficients of these variables suggest that if we fail to control for ability, the coefficient estimates for the variables accounting for parental self-employment are downward biased. Therefore, male students with higher ability are less likely to have self-employed parents.

These downward-biased estimates imply a negative correlation between parental ability and self-employment if intergenerational transfers in ability occur and ability correlate positively with college GPA. The coefficient of the ability proxy, the SSE score for the year 2002, is 0.012 (t-value=6.00). For the years 2003, 2004, and 2005, the impact of SSE score on a student's college GPA is also positive yet weaker. The inclusion of the SSE score, the SSE year, the SSE score and year interactions, and college major variables causes a positive and statistically significant estimate for $(F \times SE_{mother\ only})$. For the female students with only a self-employed mother, without controlling for ability we get downward-biased estimates for the coefficient of $(F \times SE_{mother\ only})$. This downward-biased estimate may be due to the fact that the mothers of the high ability female students are less likely plan to be self-employed.

[17]The year of college enrollment and SSE year can be used interchangeably, because in Turkey the SSE scores are only valid for one year.

2.3.1.1 Intergenerational Transfers of Ability

A college student's GPA may be positively correlated with parental education levels, conditional on SSE score. Parental education levels are expected to be correlated with parental occupational choices. Failure to control for parental education in the GPA equation may result in biased estimates. If the highly educated parents are less likely to be self-employed, ignoring the parental ability bias will result in downward-biased estimates for variables measuring parental self-employment status.

Column 3 of Table 2.3 adds two variables for parental education levels.[18] Interestingly, father's education does not have a statistically significant effect on GPA, while mother's education has a negative impact on GPA. If highly educated mothers are less likely to be stay-at-home mothers, the negative impact of highly educated mothers may be due to less time devoted to child development.

The coefficients of $SE_{father\ only}$, $SE_{mother\ only}$, $SE_{both\ parents}$, and $(F \times SE_{mother\ only})$ are significant and unaffected by the inclusion of variables accounting for parental education. The estimation results show that the coefficients of $SE_{father\ only}$, $SE_{mother\ only}$ and $SE_{both\ parents}$ are estimated to be -0.10, -0.22 and -0.30, respectively. The F-tests indicate that the variables $SE_{father\ only}$, $SE_{mother\ only}$, $SE_{both\ parents}$ and their interactions with the female indicator variable are jointly significant in the GPA equation for all three spec-

[18]The results of Column 3 of Table 2.3 are not affected if we include eight indicator variables for parental education instead of two continuous variables.

ifications. Interestingly, we fail to reject the null hypothesis that the sum of the effects of having only a self-employed mother or a self-employed father is equal to the effect of having two self-employed parents ($H_0 : SE_{father\ only} + SE_{mother\ only} = SE_{both\ parents}$). The third specification reveals that possible correlations between parental education and self-employment are insignificant after controlling for individual ability, since the coefficients of variables accounting for parental self-employment are unaffected by the inclusion of parental education variables.

The OLS results suggest that the children of the self-employed have, on average, lower GPAs even after controlling for ability bias. If we assume that they would follow their parents' self-employment by either working for their family businesses or starting new businesses, these students may have had no incentives to exert high effort even in high school. This lack of incentive would then be reflected in their SSE scores, which are based on the weighted raw exam score and high school GPA. To examine this issue, we test whether the SSE scores differ systematically between the offspring of self-employed parents and non-self-employed parents for various parental self-employment structures. The null hypothesis is that the difference between the average SSE scores of the students with or without self-employed parents is not statistically different from zero.[19] If the null hypothesis is rejected, the SSE scores of students with self-employed parents differ from those of other students and selection may

[19]The groups are the ones with only self-employed fathers, only self-employed mothers, self-employed fathers, self-employed mothers, and two self-employed parents. We exclude any professional self-employed parents.

be an important issue. Table 2.4 shows that even though students with self-employed parents have slightly lower SSE scores, in each case we fail to reject the equality of the average test scores between the students with and without self-employed parents.[20]

2.3.1.2 Isolating the Effect of Parents with Professional Occupations

Next, we investigate whether having a parent with a professional occupation affects GPA. The data set allows us to differentiate between parents who are retired, unemployed/out of the labor force, employees, employers and professionals.[21] The professionals may be self-employed (those who have their own private practices), employees (those who work in a hospital, or a law firm) or both self-employed and employees at the same time.

The indicator variables $SE_{father\ only}$ and $SE_{mother\ only}$ take on a value of one if a student has only one non-professional self-employed parent. These students may have another non-self-employed parent in professional occupation. If having a professionally employed parent correlates negatively with college GPA, and if professionally employed people are more likely to marry self-employed people, then effect of having a non-professional self-employed parent on GPA may be negatively biased due to the effect of having a profes-

[20] We also included the SSE score and parental self-employment interactions in our regressions. The coefficients of these interaction terms are not statistically significant.

[21] The self-employed group excludes professional self-employed parents. Professional self-employed parents are for instance doctors, lawyers, accountants who have their own private practices.

sionally employed parent.

In order to separate the impact of having a self-employed parent from the impact of having a professionally employed parent, we consider the impact of different parental employment combinations on GPA. Parental occupation is recoded so that mother/father can either be self-employed (non-professional), professional, or other (retired, unemployed/out of the labor force, or an employee). This recoding gives nine mutually exclusive, parental-matched occupational groups.

Table 2.5 repeats the estimation exercise of Table 2.3 by including five more indicator variables for parental occupation (the excluded group is students who do not have any self-employed or professional parents) in all three specifications.

The coefficients of $SE_{father\ only}$, $SE_{mother\ only}$ and $SE_{both\ parents}$ are unaffected when we include five indicator variables. These variables are : $\text{SE}_{father} \wedge Pro_{mother}$, $\text{SE}_{mother} \wedge Pro_{father}$, $\text{Pro}_{father\ only}$, $\text{Pro}_{mother\ only}$ and $\text{Pro}_{both\ parents}$.

The first column of Table 2.5 indicates that the students with $\text{SE}_{mother} \wedge \text{Pro}_{father}$, $\text{Pro}_{father\ only}$, and $\text{Pro}_{both\ parents}$ have lower GPAs compared to the ones with no self-employed or professional parents. However, starting with the second specification, the coefficients of these three variables are no longer statistically significant. The estimation results of Table 2.5 show that no matter how finely the parental occupation groups are defined, students with at least one professional parent have GPAs similar to others.

2.3.2 Parental Occupation and Post-Graduation Plans

An immediate concern is that the negative effect of self-employed parents on students' GPAs arise from factors other than a larger set of post-graduation opportunities. In this section, we quantify whether different parental employment statuses generate different post-graduation plans. To address this issue, the surveyed students were asked to choose one of the following seven post-graduation plans: 1) work in the family business, 2) start a new business, 3) work as an employee, 4) first work as an employee and then work for the family business, 5) first work as an employee and then start a new business, 6) go to graduate school, 7) or other.

2.3.2.1 Determinants of Post-Graduation Plans

The model and the previous literature suggest that if entrepreneurial tendencies are passed on from parent to child, the children of self-employed people are more likely to be self-employed after graduation.

Equations for different post-graduation plans of a student i can be written as:

$$PGP_{ji} = 1[Z_i'\alpha_{j0} + \alpha_{j1}SEP_{ji}' + \epsilon_{ji} > 0] \quad j = 1, ..., 6, \tag{2.8}$$

where PGP_{ji} for $j = 1, ..., 6$ are indicator variables for six post-graduation plan categories excluding "planning to be an employee." SEP_{ji} is a vector of explanatory variables for different parental self-employment statuses. Z_i is a vector of additional exogenous variables that would affect post-graduation

plans. These variables are age, SSE score, indicator variables for gender, year of enrollment, and interaction terms for SSE score and year of enrollment.

Equation (2.8) can be estimated as a multinomial logit model. Table 2.6 shows the marginal effects evaluated at the sample means relative to the base outcome "planning to be an employee." The SEP_{ji} includes two indicator variables: $SE_{father\ only}$ and $SE_{both\ parents}$.[22]

Table 2.6 shows the multinomial estimation results based on a smaller sample, the sample of surveyed students. Students with only a self-employed father are 26 percent more likely to plan to work in their family businesses than to plan to be employees. Strikingly, students with two self-employed parents are almost 62 percent more likely to plan to work in their family businesses. Students with only a self-employed father are 7 percent more likely to plan to be employees first and then become self-employed after graduation.

Having self-employed parents not only increases the likelihood of a college student's entrepreneurial intent, but also it decreases a student's probability of planning to invest further in task-specific human capital. We find that having two self-employed parents decreases the probability of planning to go to graduate school by 37 percent relative to the base outcome, while having only a self-employed father decreases the probability of planning to go

[22]These indicator variables take on a value one if only the father or both parents are non-professional self-employed individuals. We cannot control for $SE_{mother\ only}$, since having a mother who is the only self-employed parent predicts some of the post-graduation plans perfectly. For the same reason, we cannot include $(F \times SE_{father\ only})$ or $(F \times SE_{both\ parents})$ interaction terms.

to graduate school by 10 percent.

Female students are less likely plan to work in the family business or start a new business than to become employees. Increase in the family income increases the probability of planning to work in the family business.

In Table 2.6, the χ^2-tests reveal that $SE_{father\ only}$ and $SE_{both\ parents}$ are jointly significant at the one percent level. However, the choice-specific (outcome-specific) χ^2-tests show that these two variables are not jointly significant for planning to go to graduate school and planning to pursue other future plans equations.[23] To test the validity of using a multinomial logit model, we use Hausman-McFadden's IIA test (1984). The results in Table 2.6 show the IIA assumption is valid and a multinomial logit model is appropriate.

2.3.2.2 Survey Non-Response Bias

A potential problem with the above estimation, which focuses on the surveyed sample only, arises from the possibility of a survey non-response bias, a special type of sample-selection problem. The parental occupation distributions in Table 2.1 and Table 2.2 show that students with self-employed fathers are less likely to appear in the surveyed sample than in the non-surveyed sample.[24] The dependent variables in our multinomial logit model, post-graduation plans, are only available for the surveyed sample. Table 2.1

[23]Refer to Table 2.6.

[24]Thirty eight percent of the surveyed students have self-employed fathers, while 50 percent of the non-surveyed students have self-employed fathers.

demonstrates that the surveyed and the non-surveyed students are not similar in many other aspects. Therefore, estimation results based only on the surveyed sample may suffer from a survey non-response bias.

In order to account for possible survey non-response bias, we estimate the following two-equation binary response model with selection.

$$S_{i1} = 1[Z'_{i1}\delta_1 + \epsilon_{i1} > 0] - surveyed \quad (2.9)$$

$$E_{i2} = 1[Z'_{i2}\delta_2 + \epsilon_{i2} > 0] - plan\ to\ be\ 1^{st}\ degree\ entrepreneur. \quad (2.10)$$

We can estimate this two-equation model via a maximum likelihood procedure by making two assumptions: (i) The latent errors, ϵ_{i1} and ϵ_{i2}, are bivariate normally distributed with zero means, unit variances and a correlation coefficient of ρ_1. (ii) These latent errors are independent of Z_{i1}.

Equation (2.10) is the structural equation of interest, where E_{i2} is a binary indicator that takes on a value of one, if a student i plans to be a first-degree entrepreneur after graduation. Equation (2.9) is the selection equation, where S_{i1} is the survey response indicator and E_{i2} is observed only when $S_{i1} = 1$. The explanatory variable set in equation (2.10) contains Z_{i2}, which is a vector of exogenous variables that would affect post-graduation plans, such as parental self-employment, gender, gender and parental self-employment interactions, age, SSE score, year of enrollment, and interaction terms for SSE score and year of enrollment.

To account for a possible survey non-response bias, we need at least one explanatory variable in Z_{i1} of equation (2.9) in addition to the Z_{i2} of the

structural equation. Otherwise the identification is from the nonlinearities in the probit equations. A potential identifier should be correlated with whether a student is surveyed or not, but it should not affect post-graduation plans directly. As mentioned in the data section, the probability of responding to our in-class survey is expected to be higher for students who attend many classes. Therefore the students who take a heavier course load are more likely to appear in our in-class survey.

We use individual current course load to identify survey response. However, the students who have entrepreneurial tendencies may consistently take fewer or more classes compared those lacking entrepreneurial intentions. In this case using current course load to identify the survey response equation without accounting for a student's average course load may be problematic. To solve this problem, we also control for a student's average course load both in the selection equation and in the structural equation. Even if a future entrepreneur takes fewer classes each semester, accounting for the individual average course loads, the current course load should not directly affect future plans. Moreover, as Table 2.1 shows, current course load is clearly correlated with the probability of being surveyed.

The question of whether a variable is a valid instrument is open to debate. Nevertheless we see no reason to assume that the course load taken by students at the beginning of the Fall 2006 semester, controlling for their average course load, should affect a student's post-graduation plans (recorded in December 2006). An instrument is strong if its coefficient is highly signifi-

cant in the survey response equation. Staiger and Stock (1997) suggest that if the t-statistic for an instrument is above $\sqrt{10}$, it is considered to be a strong instrument. If $\rho_1 \neq 0$, students are non-randomly assigned to the surveyed sample, and the standard probit estimation of the impact of self-employed parents on the entrepreneurial intent without correcting the survey non-response bias will yield biased and inconsistent estimates.

The estimation strategy can be summarized as follows: We estimate the selection equation via probit and get $\widehat{\delta_1}$ in order to construct the conditional densities, $P(E_{i2} = 1 \mid Z_{1i}, S_{1i} = 1)$ and $P(E_{i2} = 0 \mid Z_{1i}, S_{1i} = 1)$. Then, we estimate $\widehat{\delta_2}$ and $\widehat{\rho_1}$ via a maximum likelihood model using, $P(E_{i2} = 1 \mid Z_{1i}, S_{1i} = 1)$, $P(E_{i2} = 0 \mid Z_{1i}, S_{1i} = 1)$ and $\widehat{\delta_1}$.

Table 2.7 shows the estimation results of the two-equation model described above for two alternative specifications. The first specification has an indicator variable, $(1 \leq SE_{Parent})$, that takes on a value of one if at least one parent is self-employed, while the second has two indicator variables, $SE_{father\ only}$ and $SE_{both\ parents}$, to control for self-employed parents.

The first and fourth columns of Table 2.7 present the coefficients from the probit selection equation (2.9). Having at least one self-employed parent or only a self-employed father decreases the survey response probability. In the second specification, the χ^2-test reveals that the variables, $SE_{father\ only}$, $SE_{both\ parents}$, and their interactions with the female indicator variable are jointly significant in both the selection and structural equations. We find that female students are more likely to attend their classes, and therefore more

likely to be in the surveyed sample. Consistent with our expectations, the coefficient on the identifier variable, the current course load, is positive and highly significant in all specifications (with t-values larger than $\sqrt{10}$=3.16). Interestingly the students with heavier average course loads are less likely to be surveyed.

The second and fifth columns show the marginal effects after estimating equation (2.10) as a probit model without accounting for survey non-response bias. Having at least one self-employed parent, only a self-employed father or two self-employed parents increases the probability of planning to be a first-degree entrepreneur by 26, 27 and 59 percentage points, respectively. The impact of having two self-employed parents is the largest on students planning to be first-degree entrepreneurs. For the students with only self-employed father or two self-employed parents, the self-employment experiences of the parents do not differentially affect male versus female children's entrepreneurial intent. Older students and female students are less likely to plan on becoming entrepreneurs.

The last columns of models 1 and 2 show the marginal effects after estimating the second stage of the two-equation model. The coefficients of ($1 \leq SE_{Parent}$) and $SE_{father\ only}$ are highly significant and much larger than those predicted from the models that do not control for the survey non-response bias, while the coefficient on $SE_{both\ parents}$ is not affected. The probability of first-degree entrepreneurial intent increases by 35, 35 and 59 percentage points for the students with $1 \leq SE\ Parent$, $SE_{father\ only}$ and $SE_{both\ parents}$,

respectively. This increase is over and above the probability of the baseline outcome which is 20 percent.[25] The negative impacts of age, being female on planning to be a first-degree entrepreneur disappear when we correct for the survey non-response bias.

The Wald test statistics for the independence of latent errors, (H_0 : $\rho_1 = 0$), of the selection and the structural equations are insignificant for both models. Therefore, the Wald tests of independent equations fail to reject the null hypotheses.[26] This result indicates that ignoring selection into the surveyed sample would not render the estimates of the probit model for E_{i2} equation biased and inconsistent, yet some of the estimates change after accounting for survey non-response bias.

2.4 Conclusion

This study provides evidence that parental self-employment significantly affects students' college GPAs. Our estimation results suggest that GPAs of male students with two self-employed parents or with only a self-employed mother are the lowest. Parental self-employment has a similar impact on female and male college students' GPAs with one exception: Female students with only self-employed mothers have higher GPAs than those female students who do not have any self-employed parents.

The inclusion of various controls reduces the negative impact on GPA

[25] See Table 2.1.

[26] The correlation coefficients in Model 1 and Model 2 are insignificant.

in the case of only having a self-employed father by about half, in the case of only having a self-employed mother by less then three seventhes, while the negative impact on GPA of having two self-employed parents is reduced by only one third.

An explanation for the lower GPAs of the children of self-employed parents is that in the presence of inter-generational transfers of self-employment and nepotism, offspring are more likely to have entrepreneurial intent. Hence, they may not exert more effort in acquiring task-specific career-oriented human capital taught in college. As Lazear (2004) suggests, entrepreneurs have a larger set of human capital than employees, who are expected to specialize in only one type of skill.

The results also confirm that students with family businesses are more likely to have entrepreneurial tendencies upon graduation. After accounting for the survey non-response bias, the probability of having the strongest entrepreneurial intent among the students with at least one self-employed parent is almost 175 percent higher than the baseline case. More interestingly, for students with two self-employed parents, this probability is almost 300 percent higher than the baseline case. The children of self-employed parents are not only more likely to become self-employed upon graduation, but they are also less likely to plan to attend a graduate school and invest formally in their human capital.

As implied by the model, the influence of family businesses on offspring may result from intergenerational ability transfers, better access to managerial

and industry-specific human capital, and nepotism. An extension of this study would disentangle the impact of these three determinants on entrepreneurial intent on college success. Limitations of the data set in the current study do not permit this analysis. Regardless of the cause, our results suggest that parental self-employment and family businesses not only affect post-graduation plans, but they also have negative effects on students' college success.

Table 2.1: Comparative Summary Statistics for Surveyed and Non-Surveyed Samples

	All (N=1,122)	**Surveyed (N=499)**	**Non-Surveyed (N=623)**
Variable	**Mean (Std. Dev.)**	**Mean (Std. Dev.)**	**Mean (Std. Dev.)**
Cumulative GPA	2.42 (0.62)	2.54 (0.62)	2.31 (0.61)
Course Load	5.99 (1.57)	6.12 (1.28)	5.88 (1.76)
Average Course Load	5.72 (1.16)	5.75 (1.22)	5.71 (1.11)
Age	21.49 (1.60)	21.38 (1.67)	21.58 (1.52)
Female	0.49	0.57	0.43
Major			
Bus. Ad.& Eco.	0.11	0.08	0.13
Economics	0.12	0.14	0.11
Government	0.05	0.05	0.05
Eco.(Honors)	0.02	0.01	0.02
Bus. Ad.&Eco. (Honors)	0.03	0.02	0.03
Int'l Finance	0.12	0.10	0.13
Int'l Relations	0.19	0.23	0.17
Bus. Ad.	0.36	0.37	0.36
SSE Score	253.30 (62.26)	263.05 (58.77)	245.49 (63.90)
2002	169.29 (17.67)	170.18 (17.70)	168.86 (17.67)
2003	285.47 (33.15)	285.20 (33.83)	285.70 (32.69)
2004	293.07 (28.52)	294.86 (27.02)	291.63 (29.68)
2005	291.70 (37.42)	293.23 (37.02)	288.27 (38.53)
Post-Graduation Plans			
Work In Family Business		0.16	
Start New Business		0.04	
Work as Employee		0.20	
Employee→Family Firm		0.07	
Employee→New Firm		0.17	
Graduate School		0.33	
Other		0.03	
Education			
Mother	11.55 (4.77)	11.45 (4.74)	11.64 (4.79)
Father	13.37 (4.70)	13.36 (4.70)	13.38 (4.70)

Table 2.1: (continued)

	All (N=1,122)	**Surveyed (N=499)**	**Non-Surveyed (N=623)**
Variable	**Mean**	**Mean (Std. Dev.)**	**Mean**
Entrance Year			
2002	0.30	0.23	0.36
2003	0.31	0.31	0.31
2004	0.27	0.27	0.26
2005	0.12	0.19	0.07
Hours Studied		1.79 (1.07)	
Mother's Occupation			
Housewife or Does not work	0.61	0.61	0.62
Retired	0.13	0.18	0.08
Works as an Employee	0.15	0.10	0.18
Self-Employed/Business owner/ Employer	0.06	0.06	0.06
Professional	0.05	0.05	0.06
Father's Occupation			
Does not work	0.01	0.01	0.02
Retired	0.15	0.20	0.10
Works as an Employee	0.23	0.13	0.31
Self-Employed/Business owner /Employer	0.45	0.38	0.50
Professional	0.16	0.28	0.07
Family Income			
0-20 thousand YTL		0.18	
20-40 thousand YTL		0.17	
40-60 thousand YTL		0.12	
60-80 thousand YTL		0.12	
80-100 thousand YTL		0.096	
100-120 thousand YTL		0.08	
120-140 thousand YTL		0.044	
140-160 thousand YTL		0.04	
160+ thousand YTL		0.15	

Table 2.2: Parents' Occupation Matched

All Students

			Father			
Mother	Does not work	Retired	Employee	Employer	Professional	All
Does not work	10	86	125	374	95	690
Retired	3	56	27	34	24	144
Employee	3	18	86	34	23	164
Employer	0	4	9	46	5	64
Professional	0	3	12	11	34	60
All	16	167	259	499	181	1,122

Surveyed Sample

			Father			
Mother	Does not work	Retired	Employee	Employer	Professional	All
Does not work	3	48	32	141	81	305
Retired	2	39	11	18	21	91
Employee	1	12	17	6	14	50
Employer	0	1	2	21	4	28
Professional	0	2	1	5	17	25
All	6	102	63	191	137	499

Table 2.3: OLS Results: The Effect of Self-Employed Parents on College GPA

Independent Variables	GPA (dependent)		
	1	**2**	**3**
$\text{SE}_{father\ only}$	-0.191^{**}	-0.101^{*}	-0.100^{*}
	(0.052)	(0.044)	(0.045)
$\text{SE}_{mother\ only}$	-0.351^{**}	-0.231^{*}	-0.216^{*}
	(0.093)	(0.096)	(0.098)
$\text{SE}_{both\ parents}$	-0.469^{**}	-0.301^{**}	-0.297^{**}
	(0.086)	(0.088)	(0.086)
Female	0.154^{**}	0.135^{**}	0.139^{**}
	(0.051)	(0.042)	(0.042)
Female$\times SE_{father\ only}$	-0.065	-0.015	-0.015
	(0.073)	(0.062)	(0.062)
Female$\times SE_{mother\ only}$	0.207	0.272^{+}	0.264^{+}
	(0.177)	(0.164)	(0.159)
Female$\times SE_{both\ parents}$	0.218	0.159	0.160
	(0.160)	(0.152)	(0.151)
Family Income/1,000	-0.003^{**}	-0.001^{**}	-0.001^{**}
	(0.0005)	(0.0004)	(0.0004)
Family Income (Missing)	-0.374^{**}	-0.254^{**}	-0.246^{**}
	(0.075)	(0.066)	(0.067)
Age	-0.028^{**}	0.025^{*}	0.020^{+}
	(0.010)	(0.011)	(0.012)
SSE Score		0.012^{**}	0.011^{**}
		(0.002)	(0.002)
Additional Controls †			
Hours Studied	Yes	Yes	Yes
Exam Score ×Year	No	Yes	Yes
Exam Year Indicators	No	Yes	Yes
College Major	No	Yes	Yes
Parental Education	No	No	Yes
	F-Statistics and p-values		
Self-Employed Parent Dummies	13.42 (<.001)	5.31 (.001)	5.19 (.001)
Self-Employed Parent Dummies and Self-Employed Parent×Female	10.61 (<.001)	3.38 (.002)	3.38 (.002)
$\text{SE}_{father\ only}+\text{SE}_{mother\ only} = SE_{both\ parents}$	0.33 (.567)	0.00 (.992)	0.00 (.992)
Observations	1,122	1,122	1,122
R^2	0.126	0.382	0.385

The dependent variable is the individual GPA. Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels. The indicator variables for the Business Administration Economics Combined Honors major and test year 2002 are omitted.
†See next page for the parameter estimates of these variables.

Table 2.3: (continued)

Independent Variables	GPA (dependent)		
	1	**2**	**3**
Hours Studied	−0.038	−0.044	−0.048
	(0.087)	(0.074)	(0.074)
Hours Studied^2	0.016	0.018	0.019
	(0.017)	(0.014)	(0.014)
Hours Studied (Missing)	−0.024	−0.061	−0.060
	(0.109)	(0.095)	(0.095)
Business Administration and Economics		−0.802**	−0.783**
		(0.082)	(0.082)
Economics		−0.772**	−0.752**
		(0.078)	(0.078)
Government		−0.552**	−0.540**
		(0.096)	(0.097)
Economics(Honors)		0.232**	0.240**
		(0.077)	(0.078)
International Finance		−0.803**	−0.790**
		(0.077)	(0.078)
International Relations		−0.757**	−0.742**
		(0.074)	(0.075)
Business Administration		−0.816**	−0.799**
		(0.069)	(0.070)
SSE Year 2003		0.446	0.361
		(0.379)	(0.379)
SSE Year 2004		0.168	0.076
		(0.383)	(0.384)
SSE Year 2005		0.326	0.250
		(0.499)	(0.493)
SSE Score× Year 2003		−0.006**	−0.006**
		(0.002)	(0.001)
SSE Score× Year 2004		−0.005**	−0.004*
		(0.001)	(0.002)
SSE Score× Year 2005		−0.005**	0.005*
		(0.001)	(0.002)
Father's Education			-0.009×10^{-1}
			(0.042)
Mother's Education			−0.008*
			(0.003)

The dependent variable is the individual GPA. Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^+$ indicate respectively 1%, 5% and 10% significance levels. The indicator variables for the Business Administration Economics Combined Honors major and test year 2002 are omitted.

Table 2.4: Testing the Equality of the SSE Scores by Parents' Occupation

	N	Mean	Std.Err.	t-value
(Only) Father Employer				
Other	669	255.34	2.48	
Employer (Non-Professional)	453	250.29	2.79	
difference		5.05	3.78	1.33
P-value				(.18)
(Only) Mother Employer				
Other	1,104	253.66	1.87	
Employer (Non-Professional)	18	230.92	16.69	
difference		22.74	14.78	1.53
P-value				(.12)
Father Employer				
Other	623	255.67	2.60	
Employer (Non-Professional)	499	250.33	2.63	
difference		5.34	3.74	1.42
P-value				(.15)
Mother Employer				
Other	1,058	253.79	1.92	
Employer (Non-Professional)	64	245.20	7.35	
difference		8.59	8.03	1.97
P-value				(.28)
Both Parents				
Other	1,076	253.41	1.90	
Employer (Non-Professional)	46	250.78	7.85	
difference		2.62	9.37	0.28
P-value				(.78)

Table 2.5: The Impact of Professional Parents on College GPA

Independent Variables	GPA (dependent)		
	1	**2**	**3**
(i) $\text{SE}_{father\ only}$	$-.270^{**}$	$-.080^{*}$	$-.091^{*}$
	(.042)	(.037)	(.038)
(ii) $\text{SE}_{mother\ only}$	$-.250^{+}$	$-.068$	$-.056$
	(.142)	(.131)	(.126)
(iii) $\text{SE}_{both\ parents}$	$-.418^{**}$	$-.231^{**}$	$-.221^{**}$
	(.082)	(.078)	(.078)
(iv) $\text{SE}_{father} \wedge \text{Pro}_{mother}$	$-.237$	$-.108$	$-.071$
	(.148)	(.106)	(.104)
(v) $\text{SE}_{mother} \wedge \text{Pro}_{father}$	$-.260^{*}$	$-.012$	.007
	(.109)	(.120)	(.116)
(vi) $\text{Pro}_{father\ only}$	$-.127^{*}$	.013	.017
	(.059)	(.051)	(.051)
(vii) $\text{Pro}_{mother\ only}$	$-.199$	$-.062$	$-.031$
	(.131)	(.141)	(.141)
(viii) $\text{Pro}_{both\ parents}$	$-.179^{+}$	$-.059$	$-.018$
	(.101)	(.052)	(.085)
Family Income/1,000	-0.003^{**}	-0.001^{**}	-0.001^{**}
	(0.0005)	(0.0004)	(0.0004)
Family Income (Missing)	-0.370^{**}	-0.253^{**}	-0.246^{**}
	(0.075)	(0.066)	(0.066)
Age	-0.031^{**}	0.024^{*}	0.020^{+}
	(0.010)	(0.012)	(0.012)
Female	0.145^{**}	0.140^{**}	0.144^{**}
	(0.036)	(0.030)	(0.030)
SSE Score		0.012^{**}	0.011^{**}
		(0.002)	(0.001)
Additional Controls †			
Hours Studied	Yes	Yes	Yes
Exam Score ×Year	No	Yes	Yes
Exam Year Indicators	No	Yes	Yes
College Major	No	Yes	Yes
Parental Education	No	No	Yes
Observations	1,122	1,122	1,122
R^2	.129	.381	.384

The dependent variable is the individual GPA. Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels. The indicator variables for the Business Administration Economics Combined Honors major and test year 2002 are omitted.
†See next page for the parameter estimates of these variables.

Table 2.5: (continued)

Independent Variables	GPA (dependent)		
	1	**2**	**3**
Hours Studied	−0.035	−0.044	−0.048
	(0.087)	(0.075)	(0.075)
Hours Studied^2	0.016	0.018	0.019
	(0.017)	(0.014)	(0.014)
Hours Studied (Missing)	−0.029	−0.060	−0.059
	(0.109)	(0.096)	(0.096)
Bus. Ad.& Eco.		−0.798**	−0.781**
		(0.081)	(0.082)
Economics		−0.770**	−0.752**
		(0.078)	(0.078)
Government		−0.548**	−0.540**
		(0.096)	(0.097)
Eco.(Honors)		0.235**	0.241**
		(0.077)	(0.077)
Int'l Finance		−0.804**	−0.793**
		(0.076)	(0.077)
Int'l Relations		−0.757**	−0.745**
		(0.074)	(0.075)
Bus. Administration		−0.816**	−0.801**
		(0.069)	(0.070)
SSE Year 2003		0.449	0.370
		(0.379)	(0.378)
SSE Year 2004		0.191	0.102
		(0.378)	(0.379)
SSE Year 2005		0.352	0.274
		(0.503)	(0.498)
SSE Score× Year 2003		−0.006**	−0.006**
		(0.001)	(0.001)
SSE Score× Year 2004		−0.005**	−0.004**
		(0.001)	(0.001)
SSE Score× Year 2005		−0.005**	0.005*
		(0.001)	(0.002)
Father's Education			-0.003×10^{-1}
			(0.042)
Mother's Education			−0.008*
			(0.003)

Table 2.6: Multinomial Logit: The Determinants of Post-Graduation Plans, Marginal Effects, Base Outcome=Plan to be an Employee (N=499)

	Family Business	**New Bus.**	**Employee→ Family Bus.**	**Employee→ New Bus.**	**Graduate School**	**Other**
(i) **SE**$_{father\ only}$	.265**	.005	.071*	−.019	−.103^{+}	−.037^{+}
	(.049)	(.004)	(.031)	(.012)	(.057)	(.027)
(ii) **SE**$_{both\ parents}$	.616**	−.029**	.148	−.212	−.367**	.004
	(.104)	(.009)	(.097)	(.021)	(.051)	(.022)
Age	−.008	−.004*	−.016	.001	.015	−.002
	(.011)	(.002)	(.010)	(.005)	(.019)	(.003)
Female	−.078*	−.008^{+}	−.020	−.008	.039	−.003
	(.032)	(.004)	(.025)	(.013)	(.053)	(.012)
Income/1,000	.0009**	.0002	.0002	.0003	−.0004	−.0003*
	(.0002)	(.0003)	(.0002)	(.002)	(.0005)	(.0001)
SSE Score	−.008**	−.0008**	−.003**	−.0005	.011**	−.001
	(.002)	(.0003)	(.001)	(.0008)	(.003)	(.008)
Year 2003	−.539*	−.177	−.015	−.029	.962**	−.023
	(.280)	(.233)	(.035)	(.038)	(.045)	(.041)
Year 2004	−.283	−.221	.035	−.077	.530	−.094
	(.241)	(.313)	(.024)	(.089)	(.633)	(.132)
Year 2005	−.339*	−.021	−.095	−.043	−.115	−.147
	(.160)	(.027)	(.084)	(.038)	(.476)	(.164)
SSE × 2003	.007**	.0007*	.002	.006	−.012**	.001
	(.002)	(.0002)	(.002)	(.009)	(.003)	(.001)
SSE × 2004	.005*	.0007*	.001	.008	−.007^{+}	.001
	(.002)	(.0003)	(.001)	(.009)	(.004)	(.001)
SSE × 2005	.006**	.0005	.002^{+}	.003	−.006^{+}	.001
	(.002)	(.0003)	(.001)	(.009)	(.003)	(.001)
χ^2 (Pr>χ^2)		23,806	(<.001)			
Pseudo R^2		.152				
Log Pseudolikelihood		-727.35				
χ^2 Stat for *(i)*=*(ii)*=0		17,600				
[dof]		[12]				
(Pr>χ^2)		(<.001)				
Choice Spec. χ^2	53.94	4157.06	19.48	3,575	4.03	3.80
[dof]	[2]	[2]	[2]	[2]	[2]	[2]
(i)=*(ii)*=0 (Pr>χ^2)	(<.001)	(<.001)	(<.001)	(<.001)	(.133)	(.149)

Hausman Tests Of IIA Assumption H_0=Odds are Independent of Other Alternatives

	χ^2	df.	$(P > \chi^2)$	Evidence
Work in the Family Firm	.000	2	>.999	for H_0
Start a New Firm	.000	1	>.999	for H_0
Employee→Family Firm	.000	2	>.999	for H_0
Employee→New Firm	.000	1	>.999	for H_0
Graduate School	.000	2	>.999	for H_0
Other	.000	2	>.999	for H_0
Work as an Employee	.000	2	>.999	for H_0

Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels. The indicator variable for test year 2002 is omitted. The results reported for the multinomial estimations are marginal effects rather than coefficients.

Table 2.7: The Determinants of Entrepreneurial Intent: Marginal Effects After Maximum Likelihood Probit Model with Sample Selection

	Model 1			Model 2		
		Pr(1^{st}Degree Entre.=1)			Pr(1^{st}Degree Entre.=1)	
	Pr(Surveyed=1)	Not Corrected	Corrected	Pr(Surveyed=1)	Not Corrected	Corrected
Current Course	.089**	...	...	.090**	...	...
Load	(.026)	...	...	(.027)	...	...
(1≤ SE$_{Parent}$)	−.201^{+}	.262**	.346*	...	...	...
	(.122)	(.057)	(.142)	...	...	...
F×(1≤ SE$_{Parent}$)	−.178	−.023	−.023	...	...	...
	(.158)	(.063)	(.094)	...	...	...
SE$_{father\ only}$	...	...	...	−.267*	.273**	.354*
	...	...	...	(.116)	(.064)	(.162)
SE$_{both\ parents}$	...	...	...	.153	.595**	.594**
	...	...	...	(.268)	(.137)	(.159)
F×SE$_{father\ only}$	...	...	...	−.089	−.020	−.026
	...	...	...	(.163)	(.064)	(.092)
F×SE$_{both\ parents}$	...	...	...	−.518	−.056	−.062
	...	...	...	(.495)	(.098)	(.169)
Avg. Course Load	−.177**	−.018	−.037	−.182**	.017	.035
	(.041)	(.016)	(.43)	(.041)	(.015)	(.047)
Age	.058*	−.026*	−.040	.057^{+}	−.024*	−.038
	(.030)	(.011)	(.028)	(.030)	(.011)	(.031)
Female	.493**	−.094^{+}	−.160	.466**	−.089^{+}	−.149
	(.107)	(.053)	(.152)	(.105)	(.052)	(.157)
SSE Score	−.002	−.009**	−.014**	−.002	−.010**	−.014*
	(.004)	(.002)	(.005)	(.004)	(.002)	(.006)
Year 2003	.451	−.757**	−.866**	.501	−.799**	−.891**
	(.935)	(.172)	(.170)	(.923)	(.156)	(.155)
Year 2004	−.756	−.566*	−.689**	−.766	−.591*	−.705**
	(1.03)	(.230)	(.266)	(1.03)	(.233)	(.270)
Year 2005	−.366	−.362*	−.415	−.334	−.404**	−.431
	(1.23)	(.146)	(.276)	(1.23)	(.155)	(.296)
SSE × Year 2003	.0004	.009**	.012*	.0001	.009**	.012*
	(.0004)	(.002)	(.005)	(.004)	(.002)	(.005)
SSE × Year 2004	.005	.007**	.010*	.005	.007**	.010*
	(.005)	(.002)	(.004)	(.005)	(.002)	(.004)
SSE × Year 2005	.006	.007**	.009*	.007	.007**	.010*
	(.005)	(.002)	(.003)	(.005)	(.002)	(.004)
Observations	1,108	485	1,108	1,108	485	1,108
Log Pseudo L.	-891.1	-191.3	-891.1	-885.2	-186.2	-885.2
$\widehat{\rho}$ (std. err.)	−.323(.703)	...		−.303(.766)	...	
Wald for $\rho = 0$ (p)	.18 (.66)	...		.14 (.71)	...	
χ^2-Stat for SE$_{Parent}$ Dummies (p)	...	...	...	32.81 (<.001)	31.77 (<.001)	32.81 (<.001)
χ^2-Stat for SE$_{Parent}$ Dummies×F (p)	57.23 (<.001)	43.45 (<.001)	57.23 (<.001)	64.52 (<.001)	53.08 (<.001)	64.52 (<.001)

Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels. The indicator variable for test year 2002 is omitted. The results reported for the entrepreneurial intent equation estimations are marginal effects rather than coefficients, while the results for the survey response equation are the coefficients after probit estimation.

Chapter 3

Migration and *Loving*

THE LAND OF HOPE
Yes, we are going to the north!
I don't care to what state
Just so I cross the Dixon line,
From this southern land of hate,
Lynched and burned and shot and hiring,
And not a word is said.
No law whatever the protect
It's just a "nigger" dead.
Go on dear brother you'll ne'er regret;
Just trust in God; pray for the best.
And at the end you're sure to find
"happiness will be there."[1]

From the early twentieth century to the 1970s, the United States witnessed a massive migration of southern-born Americans to the West and to the North in search of better lives.[2] This mass emigration of blacks from the Southern states, also known as the "Great Migration," resulted in a drastic change in the geographical distribution of the black population (Fligstein [1981], Marks [1989], Goodwin [1990], Lemann [1991], Trotter [1991] and Tolnay, and Crow-

[1] By William Crosse.

[2] There are various definitions of the "South", in this study I use the definition of the Southern region by the United States Census Bureau, which includes Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia and the District of Columbia.

den and Adelman [2002]). In the first decade of the 20^{th} century, 90 percent of blacks lived in the South, while only 4.4 percent lived in the Northeast, and 5.6 percent lived in the Midwest. However, by the 1970s only 53 percent of blacks lived in the South, while 19.3, 20.2, and 7.5 percent lived in the Midwest, Northeast and West respectively (U.S. Census Bureau [2002], Tolnay [2003]).

A limited number of studies explored social forces affecting black migration during the Great Migration. Previous literature considers racial violence and inequality, which were promoted by the Jim Crow laws in effect from 1877 until the mid-1970s, in the Southern and the Border states, among the most important social push factors that drove migrants to leave their places of origin (for instance see Fligstein [1981], Grossman [1989], Marks [1989], Goodwin [1990], Lemann [1991], Trotter [1991], and Tolnay and Beck [1992]).

Traces of racial segregation can be found much earlier even in the domain of intimate relationships between blacks and whites. Anti-miscegenation laws banning interracial relationships between blacks and whites were enforced as early as 1662 (Newbeck [2004] and Wallenstein [2004]). Forty-one states outlawed black-white interracial marriage at some point in U.S. history (Browning [1951] and Newbeck [2004]). Table 3.1 shows a list of states categorized by the year of their ban of anti-miscegenation laws. Virginia was the first to ban interracial marriages and its anti-miscegenation laws had been effective for 305 years. Eleven of these 41 states repealed their anti-miscegenation laws in the 19^{th} century, and with the lead of California in 1948, another 14 repealed

their laws before 1967.[3] Maryland was the last state that voluntarily revoked its anti-miscegenation statutes (in 1967). However, 16 southern states were forced to do so by the U.S. Supreme Court ruling in the case of *Loving v. Virginia*, 388 U.S. 1 (1967).[4] In June 12, 1967, Chief Justice Warren delivered the opinion of the Court:

> This case presents a constitutional question never addressed by this Court: whether a statutory scheme adopted by the State of Virginia to prevent marriages between persons solely on the basis of racial classifications violates the Equal Protection and Due Process Clauses of the Fourteenth Amendment.
>
> ...In June 1958, two residents of Virginia, Mildred Jeter, a Negro woman, and Richard Loving, a white man, were married in the District of Columbia pursuant to its laws. Shortly after their marriage, the Lovings returned to Virginia and established their marital abode in Caroline County. At the October Term, 1958, of the Circuit Court [388 U.S. 1, 3] of Caroline County, a grand jury issued an indictment charging the Lovings with violating Virginia's ban on interracial marriages. On January 6, 1959, the Lovings pleaded guilty to the charge and were sentenced to one year in jail;

[3]Fryer (2007) classifies Kansas, New Mexico and Washington in the Never illegal group, because these states repealed the laws before the 1900s and before their statehood. Here they are classified in the 19^{th} Century legalized group, because regardless of statehood, they repealed these laws before the 1900s.

[4]The *Loving* state group does not entirely correspond to the definition of the Southern region by the United States Census Bureau. The *Loving* states also includes Missouri and excludes Maryland and the District of Columbia. Nevertheless, I call the *Loving* states as the Southern states.

however, the trial judge suspended the sentence for a period of 25 years on the condition that the Lovings leave the State and not return to Virginia together for 25 years. He stated in an opinion that:

> "Almighty God created the races white, black, yellow, malay and red, and he placed them on separate continents. And but for the interference with his arrangement there would be no cause for such marriages. The fact that he separated the races shows that he did not intend for the races to mix." ...
>
> Marriage is one of the "basic civil rights of man," fundamental to our very existence and survival. ...The Fourteenth Amendment requires that the freedom of choice to marry not be restricted by invidious racial discriminations. Under our Constitution, the freedom to marry, or not marry, a person of another race resides with the individual and cannot be infringed by the State. These convictions must be reversed. It is so ordered.[5]

In 9 states interracial marriage has never been illegal. The U.S. map in Figure 3.1 shows these four main state groups: 9 "Never illegal" states, 11 states in the "19^{th} Century legalized" group, 14 states in the "1948-1967 Legalized" group and the "*Loving*" group of 16 states that had to remove the ban on interracial marriage after the U.S. Supreme Court ruling in 1967. A

[5]FindLaw: *Loving v. Virginia*, 388 U.S. 1 (1967) `http://laws.findlaw.com/us/388/1.html`.

way to describe the migration patterns of blacks during the Great Migration by using this classification is to state that blacks left *Loving* states and migrated to 1948-1967 legalized, 19^{th} century legalized, and Never illegal state groups.

Fryer (2007) provides a detailed review of interracial marriage trends during the 20^{th} century and evaluates the explanatory power of current theories of family formation. He finds that over the period of the Great Migration, black male interracial marriage rates (IMRs hereafter) differed remarkably among states that never had any anti-miscegenation laws, states that voluntarily repealed their anti-miscegenation laws either before or during the 19th century, and states that were forced to strike down their statutes by the U.S. Supreme Court. While Fryer briefly report different IMRs in different state groups, the current study investigates possible causes of unequal IMRs among state groups by focusing on the impact of interracial marriage, state of birth and ban of anti-miscegenation laws on married black male migrants' destination selection in the U.S.

The main question of interest is whether interracially married black males sort themselves into four state groups of destination differently from those who have non-black spouses and whether the anti-miscegenation laws in their state of birth and the U.S. Supreme Court decision in the case of *Loving v. Virginia* affected this sorting.

The harmony of relationships between races in a society like the U.S. depends on the level and quality of interaction between different racial groups. Interracial marriages constitute the most intimate type of interactions between

races. Fryer (2007) shows that relationships between the different races and IMRs in the U.S. are related to and affected by individual education, anti-miscegenation laws, regions and states of residence, and military statuses of individuals. This study tries to understand how anti-miscegenation laws differentially affected the incentives to migrate and the geographical sorting of inter- and intraracially married black males during the Great Migration.[6]

My calculations based on the 5 percent sample of Integrated Public Use Microdata Series (IPUMS) from the 1980 U.S. Census data reveal that black male IMRs are highest in the 1948-1967 Legalized, lowest in the *Loving* states and between these levels in the 19^{th} Century legalized, and Never illegal states. I use a multinomial probit model to investigate the relationship between interracial marriages, anti-miscegenation laws, and migration patterns of married black males.

The results suggest that statutes banning interracial marriages had an impact on the sorting of married black males into different state group categories. Interracially married black males who were born in the *Loving*, 19^{th} Century legalized, and Never illegal states were less likely to reside in their states of birth relative to residing in the 1948-1967 Legalized states than those black males with black wives. This disproportional movement of interracially married black males born in the *Loving*, 19^{th} Century legalized, and Never illegal states could have caused these high IMRs in 1948-1967 Legalized states.

[6]Intraracial marriages refer to those between two individuals of same race.

However, the younger generation of *Loving*-born interracially married black males who entered the marriage market after the anti-miscegenation laws were struck down in 1967 are more likely to stay in their birth states than those younger generation of *Loving*-born intraracially married black males.

3.1 Data Set and Black Male Interracial Marriage

I use the 5 percent sample of the Integrated Public Use Microdata Series (IPUMS) based on the 1980 U.S. Census data (Ruggles et al. [2004]). The 1980 Census data set is preferred because it is the most recent data set that covers both the Great Migration and the post-1967 period, and because it allows construction of a variable that determines the year of first marriage. The variables age at first marriage, age in 1980, and times married are jointly used to determine the exact year of first marriage. The use of these three variables allows one to determine the incidence of all first marriages rather than the prevalence of all marriages, first and subsequent combined, at the time of the 1980 Census enumeration. The IPUMS samples based on the 1940, 1960 and 1970 U.S. Census data also allow determination of the year of first marriage. However, the 1980 sample is the most recent data set that covers the longest period of time (13 years) after the U.S. Supreme Court decision to strike down anti-miscegenation laws.

The IPUMS Census data provide sufficient information to identify married couples currently living in the same household. This information allows one to match each married black male with his spouse's characteristics, includ-

ing race, and then to calculate the number of black males with black spouses, white spouses and spouses of other races.[7] The black male/white female Interracial Marriage Rate (IMR) for black males in their first marriages is the ratio of black males with white spouses to the total number of married black males.[8] The black male/other race female IMR for black males in their first marriages is defined similarly.

The sample is restricted to all U.S.-born black males aged 15-80 who are in their first marriages.[9] The sample consists of 137,117 black males in their first marriages, who make up 79 percent of all married black males. The 33,743 black males who have been married more than once are excluded from the sample, because it is impossible to identify the year of their current marriage or the race of their first wife.

The black male/white female interracial marriage is a rare event; the IMR is 2.31 percent for the black males who were in their first marriages in 1980. Black male/other race female interracial marriage is even rarer; the black male/other race female IMR is 0.66 percent for black males who were in their first marriages in 1980 (see Table 3.2 and Table 3.3). Table 3.2 presents black male/white female interracial marriage rates for black males in four state

[7]The other race category includes American Indians, Alaskan Natives, Asians, Pacific Islanders and others.

[8]Here I focus on heterosexual marriages.

[9]The results are not affected when the sample is restricted to the black males aged 15-60. Black female interracial marriages are excluded from the analysis, as the low IMR for black female/white male (0.77 percent) and black female/other-race male (0.21 percent) yield large standard errors and insignificant estimates.

groups (*Loving*, 1948-1967 Legalized, 19^{th} Century legalized and Never illegal states) and by the different time periods these first marriages occurred. Black male IMRs are calculated for the years before 1967, the years after 1967, and for all marriages before 1980. Table 3.2, Column 1 shows the black male IMRs for marriages that occurred before or in 1967. Column 2 shows the black male IMRs for marriages that occurred after 1954 and before 1967. I calculate IMRs from 1954 to 1967, "Before 2" period, which spans exactly 13 years, the same number as the "After" period, to yield a comparable number of years following the U.S. Supreme Court decision. The third and the fourth columns show the IMRs for black males from 1967 until 1980 and for all years before 1980. For instance, the first row and the first column of the upper panel of Table 3.2 gives the ratio of black males with white spouses to all black males in their first marriages residing in *Loving* states and married before or in 1967.

The upper panel of Table 3.2 shows that the black male/white female IMR among the residents of *Loving* states increased the most after 1967 compared to those in the other state groups. In *Loving* states the IMRs increased by 429 or 278 percent depending on the definition of the period before 1967. While the percentage increase of IMR was highest in the *Loving* states, the IMR in the *Loving* states never reached the levels of those in other state groups. For example, the black male/white female IMR for post-1967 period is 1.85 in *Loving* states, while it is 8.82, 5.95 and 7.03 in the 1948-1967 legalized, 19^{th} Century legalized and Never illegal states respectively. The fourth column shows that IMRs for the entire period are the lowest in the *Loving* states

(1.01), highest in the 1948-1967 Legalized states (5.03), and fall between these extremes in the 19^{th} Century legalized (3.17) and Never illegal states (3.88).

The middle panel of Table 3.2 presents the black male IMRs grouped by state of birth. A comparison of the fourth columns of the upper and middle panels reveals that black male IMRs are larger (in every state group) when individuals are grouped by their birth states rather than their states of residence. Among the black males who were born in the *Loving* states the overall IMR was 1.53, while for those residing in the *Loving* states in 1980, the IMR rate was only 1.01.

The IMRs for the 89,008 married black males who were born in one of the four state groups and resided in the same state group in 1980 are presented in the bottom panel of Table 3.2. The fourth columns of all three panels of Table 3.2 reveal that the IMRs are the lowest for black males residing in the same state of birth.

The last row and the fourth column of each panel demonstrate that the IMR for "stayer" black males is (1.77 percent) lower than the IMR for all black males (2.31 percent). One implication of different IMRs is that the black males who are not residents of the state group in which they were born have different IMRs than those who are the residents of their state group of birth. Therefore, interracially married black males are expected to be sorted differentially in their states of residence than those with black wives. The next section investigates the differential sorting patterns of married black males in their respective states of residence by birth state, time of ban of anti-miscegenation

laws in the birth state and interracial marriage.

Table 3.3 shows the black male/other race female IMRs for black males by the four state groups previously defined and by the different time periods these first marriages occurred. The IMRs reported in Table 3.3 are similar in terms of relative magnitude, and as expected each cell is smaller than the corresponding cell in Table 3.2.

3.2 Migration and Black Male Interracial Marriage

The previous literature on the Great Migration shows that from 1910 to the 1970s, millions of blacks migrated from Southern states to the Northern, Midwestern and Western states. This section investigates the role of anti-miscegenation laws on married black males' destination selections.

3.2.1 Empirical Model

To examine the role of the year anti-miscegenation laws were banned on the sorting of inter- and intraracially married black males in destination states, individuals are categorized into four different state groups, Never illegal, 19^{th} Century legalized, 1948-1967 Legalized, and *Loving*, by their birth states and their states of residence.

While the state group of residence in the 1980 Census enumeration is identified as the migration destination, some black males may have moved within their state groups of birth, moved out of their state group of birth and returned, or moved after collection of the Census data. Complete information

on an individual's migration history would be ideal, but using the state of residence as the destination should not invalidate the results.

The destination choice equations for a black male i can be written as:

$$D_{ij} = 1[\alpha_{j0}B'_{ij} + \alpha_{j1}IM'_{ij} + \alpha_{j2}(IM'_{ij} \times B'_{ij}) + \alpha_{j3}X'_{ij} + \epsilon_{ji} > 0] \quad j = 1, 2, 3, \quad (3.1)$$

where D_{i1}, D_{i2}, and D_{i3} are indicator variables for three destination state groups (or three state groups of residence): *Loving*, 19^{th} Century legalized, and Never illegal states (excluding the 1948-1967 Legalized group). The B_{ij} includes three indicator variables for the state group of birth: *Loving*, 19^{th} Century legalized, and Never illegal. The IM_{ij} is a vector of indicator variables for having a white wife or a wife of another race. The vector X_{ij} includes age, education and the interaction terms of variables B_{ij}, IM_{ij}, and $(IM'_{ij} \times B'_{ij})$ with an indicator variable (Age$\leq$31), which takes on a value of one if a black male i is 31 years old or younger.

Individuals who were 31 or younger as of the 1980 Census enumeration were 18 or younger in 1967, the year the anti-miscegenation laws of 16 *Loving* states were struck down. My calculations based on the 1980 Census data show that 92 percent of all black males in their first marriages married after 18. Given that the great majority of individuals marry after 18, a typical black male who was 31 or younger (younger group hereafter) as of the 1980 Census enumeration experienced a marriage market free of the shadow of anti-miscegenation laws. Therefore, I expect intra- and interracially married black

males who were 31 or younger to have different destination sorting than those intra- and interracially married black males who were older than 31 during the 1980 Census enumeration (older group hereafter).

The equations D_{ij} for $j = 1, 2, 3$ can be estimated as a multinomial probit model, where D_{i1}, D_{i2}, and D_{i3} are destination state groups (*Loving*, 19^{th} Century legalized, and Never illegal states respectively), compared to residing in the 1948-1967 legalized state group during the 1980 Census enumeration. A multinomial probit model is preferred because it does not require the restrictive zero-covariance assumption imposed by the multinomial logit model, heavily based on the IIA assumption.

3.2.2 Results and Discussion

The marginal effects after the multinomial probit estimation are presented in Table 3.4. They are evaluated at the sample mean relative to the base outcome of residing in one of the 1948-1967 Legalized states. Table 3.4 shows that intraracially married *Loving*-born older generation black males are 53, 5, and 2 percentage points more likely to reside in the *Loving*, 19^{th} Century legalized or Never illegal states, respectively, than to reside in the 1948-1967 Legalized states, while *Loving*-born older black males with white or other-race wives are 29 and 35 percentage points, respectively, less likely to reside in the *Loving* states than to reside in the 1948-1967 Legalized states. For *Loving*-born older generation black males, having a white or other-race wife does not affect the likelihood of residing in 19^{th} Century legalized or Never illegal states.

One way to test the impact of the ban on anti-miscegenation laws in 1967 on black males' choices of destination states is to focus on black males who were likely to be in the marriage market after 1967. If the differential sorting of interracially married black males into destination state groups is independent of anti-miscegenation laws, then the younger generation of black males who were in the marriage market after 1967 are expected to make similar destination selections to the older generation of black males.

To test whether the generation of black males who were not constrained by anti-miscegenation laws while in the marriage market sorted themselves differently into destination state groups than those black males who were constrained by those laws I use triple differencing. I interact the indicator variable for younger generation with birth state and the race of spouse, in other words (Age$\leq$31) is interacted with variables B_{ij}, IM_{ij}, and $(IM'_{ij} \times B'_{ij})$.

The first column of Table 3.4 demonstrates that, compared to the older generation of intraracially married *Loving*-born black males, the intraracially married younger black males who were born in *Loving* states are 7 percentage points more likely to stay in the *Loving* states relative to residing in the 1948-1967 Legalized states. This finding is consistent with the historical fact that migration out of the Southern states slowed down or even reversed after 1970s. Interestingly, the interracially married younger black males who were born in *Loving* states are 15 percentage points more likely to reside in the *Loving* states than are intraracially married younger black males. The coefficient of [(Age$\leq$31)$\times$Other Race Wife$\times$Born in *Loving*] is positive and statistically

significant at the 10 percent level.

This analysis shows that interracially married black males who are from *Loving* states are less likely to stay in the *Loving* states than those *Loving*-born black males with black wives. However, this result does not hold for those black males who were likely to be in the marriage market when the anti-miscegenation laws were no longer in effect.

When interpreting the results, a caveat is necessary about the direction of causation between having a non-black wife and a black male's choice of destination state. The Census data do not allow determination of whether a black male married before or after his migration, which prevents determination of whether a black male married in his birth state or in the destination state.

Several scenarios may have led to the final distribution of black males in the destination states. First, prior to 1967 black males who were born in the *Loving* states could choose to relocate to the non-*Loving* states to marry their existing non-black girlfriends. Second, black males who were born in the *Loving* states could choose to relocate to the non-*Loving* states even in the post-1967 period because interracial marriage could be perceived as more of a taboo in the *Loving* states even after these laws were struck down. These differences in perception seem plausible, because the non-*Loving* states either did not have any anti-miscegenation laws or voluntarily repealed those laws, while the *Loving* states were forced to strike down their anti-miscegenation laws by the U.S. Supreme Court. Third, black males who were born in the *Loving* states could choose to emigrate for better social and economic opportunities

and could legally marry a non-black in the destination state. The results show that the interracially married older black males who were born in the *Loving* states are less likely to reside in the *Loving* states, and the direction of causation is irrelevant for the results.

While it is important to focus on the differential migration patterns of *Loving*-born black males, one should also investigate non-*Loving* born black males' destination choices to see the whole picture of differential migration of black males. Doing so would help one to understand the much larger IMRs in the 1948-1967 Legalized states compared to other state groups as shown in Table 3.2 and Table 3.3.

The probability of residing in the same state group of birth is 50 and 55 percentage points higher for intraracially married older black males who were born in the 19^{th} Century legalized and Never illegal states respectively. Quite interestingly, older generation black males with white spouses who were born either in the 19^{th} Century legalized or Never illegal states are only 7 percentage points less likely to reside in their states of birth compared to 29 percentage points for *Loving*-born older black males with white spouses. This striking result implies that not only *Loving*-born interracially married older generation black males are more likely to reside in the 1948-1967 Legalized states, but also that interracially married older generation black males from other state groups are more likely to reside in 1948-1967 Legalized states. This disproportional presence of interracially married black males in 1948-1967 Legalized states explains the highest IMRs in 1948-1967 Legalized states (by current state of

residence) in Table 3.2 and Table 3.3.

The younger generation *Loving*-born black males with white wives are more likely to reside in their birth states compared to those younger generation *Loving*-born black males with black wives. However, the younger black males who were born in the 19^{th} Century legalized or Never illegal states married to other-race wives are 13 or 11 percentage points less likely to reside in the same state than those intraracially married younger black males born in the same state groups. Based on these results above, one can conclude that statutes banning interracial marriages affected the sorting of the U.S. born black males into different state group categories.

3.3 Conclusion

The emigration of Southern-born blacks during the Great Migration affected the lives of millions of blacks and drastically changed the distribution of black population in the U.S. Unsatisfied with economic, social and political inequality in the South, educated and uneducated blacks alike joined in the biggest migration of blacks in U.S. history. Racial inequality between blacks and whites pervaded even the most intimate interactions, marriages. Anti-miscegenation laws remained effective in 16 southern states until the U.S. Supreme Court decision in *Loving v.Virginia* in 1967 forced their ban.

This study investigates the different migration behavior of inter- and intraracially married black males across four state groups. Nine states never had such laws (Never illegal), 11 voluntarily repealed them in the 19^{th} century

(19^{th} Century legalized), another 14 voluntarily repealed in 1948-1967 period (1948-1967 Legalized), and 16 *Loving* states repealed in 1967.

The results show that while *Loving*-born intraracially married black males are more likely to reside in the *Loving*, 19^{th} Century legalized or Never illegal states, *Loving*-born interracially married black males are less likely to reside in the *Loving* states. Strikingly, among the younger generation of *Loving*-born black males who experienced a marriage market free of anti-miscegenation laws, the interracially married black males are more likely to reside in the *Loving* states than the intraracially married black males.

The finding that older generation interracially married black males are more likely to reside in the 1948-1967 Legalized states is not limited to those born in the *Loving* states. Older generation interracially married black males from 19^{th} Century legalized or Never illegal states are also more likely to reside in 1948-1967 Legalized states. This disproportional presence of interracially married black males in the 1948-1967 Legalized states may account for the highest IMRs in 1948-1967 Legalized states.

When it comes to gauging the contributions of this study, it is important to keep in mind the limitations of using Census data in migration research. Ideally longitudinal data set with complete migration, dating and marriage history of individuals would be preferred. Nonetheless, the information on recent migrants from the IPUMS based on the U.S. Census data may provide some insight to the results. Another limitation arising from the use of Census data is that the inability to determine the order of migration and marriage

decision may cause reverse causality. Again, I avoid making bold claims about the direction of causation between marriage and migration and looking at the differential sorting of younger and older generations would help to alleviate these concerns.

Regardless of its potential shortcomings, this study shows that anti-miscegenation laws and state of birth affected the sorting of inter- and intraracially married black males into destination state groups during the Great Migration. The results presented here only explain a small part of the history of anti-miscegenation laws, Great Migration, and interracial relations in the U.S. Future work might involve examination of the role of distances traveled, geographic variation in economic opportunities and variation in punishment for the crime of interracial marriage prior to 1967. Further research on these issues will expand our limited knowledge on the delicate history of interracial relationships.

Table 3.1: States Grouped by Their Bans of Anti-Miscegenation Laws

Loving states	1948-1967 Legalized	19*th* Century legalized	Never illegal
Alabama	California (1948)	Illinois	Alaska
Arkansas	Oregon (1951)	Iowa	Connecticut
Delaware	Montana (1952)	Kansas	Hawaii
Florida	N. Dakota(1955)	Maine	Minnesota
Georgia	Colorado (1957)	Massachusetts	New Hampshire
Kentucky	S. Dakota(1957)	Michigan	New Jersey
Louisiana	Idaho (1959)	New Mexico	New York
Mississippi	Indiana (1959)	Ohio	Vermont
Missouri	Nevada (1959)	Pennsylvania	Wisconsin
N. Carolina	Arizona (1962)	Rhode Island	
Oklahoma	Nebraska (1963)	Washington	
S. Carolina	Utah (1963)		
Tennessee	Wyoming (1965)		
Texas	Maryland (1967)		
Virginia			
W.Virginia			

Source: Penalties are the most recent revisions of the laws in question by year 1951. Browning (1951) "Anti-Miscegenation Laws in the United States" and Newbeck (2004) "Virginia Hasn't Always Been for Lovers: Interracial Marriage Bans and the Case of Richard and Mildred Loving"are the main sources. Fryer (2007) classifies Kansas, New Mexico and Washington in the Never illegal group since these states repealed these laws before 1900s and before statehood. Here I classify them in the 19*th* Century legalized group because regardless of statehood, they repealed these laws before the 1900s.

Table 3.2: Black Male/White Female Intermarriage Rates for Black Males in Their First Marriages: Ages 15-80

	Year of First Marriage=t					
By State of Residence	Before 1 t≤1967	Before 2 $t \in (1954, 67)$	After t>1967	All $t \leq 1980$	$\frac{After}{Before1}$ %Δ	$\frac{After}{Before2}$ %Δ
Loving states	0.35	0.49	1.85	1.01	429	278
1948-67 Legalized	1.85	2.74	8.82	5.03	377	222
19th C. legalized	1.22	1.86	5.95	3.17	388	220
Never illegal	1.79	1.93	7.03	3.88	293	264
All	0.90	1.29	4.16	2.31	362	222
By State of Birth						
Loving states	0.61	0.93	2.91	1.53	377	218
1948-67 Legalized	1.92	2.60	7.99	5.48	316	204
19th C. legalized	2.38	2.92	7.24	5.14	204	148
Never illegal	3.21	3.36	8.05	5.93	151	140
All	0.90	1.29	4.16	2.31	362	222
Same Current & Birth State						
Loving states	0.30	0.42	1.63	0.88	443	288
1948-67 Legalized	1.72	2.39	8.08	5.49	370	238
19th C. legalized	2.01	2.34	5.98	4.27	197	156
Never illegal	2.85	2.64	7.51	5.35	164	184
All	0.64	0.85	3.07	1.77	379	261

Source: 5% IPUMS, the 1980 U.S. Census data. The sample is restricted to all U.S.-born black males aged 15-80 in their first marriages. Black-white interracial marriage rate for black males is the ratio of black males married to white women to the ratio of all black married men in their first marriages. D.C. is excluded from the sample. The "After" period spans the 13 years from 1967 till 1980. The first of the two "Before" periods spans 53 years from 1913 to 1967, and the second one spans 13 years from 1954 to 1967.

Table 3.3: Black Male/Other-Race Female Intermarriage Rates for Black Males in Their First Marriages: Ages 15-80

	Year of First Marriage=t					
By State of Residence	Before 1	Before 2	After	All	$\frac{After}{Before1}$	$\frac{After}{Before2}$
	t≤1967	$t \in (1954, 67)$	t>1967	$t \leq 1980$	%Δ	%Δ
Loving states	0.18	0.26	0.61	0.37	239	135
1948-67 Legalized	0.97	1.46	2.49	1.66	157	070
19th C. legalized	0.42	0.48	1.01	0.67	140	110
Never illegal	0.52	0.49	1.39	0.87	167	184
All	0.37	0.50	1.03	0.66	178	106
By State of						
Loving states	0.31	0.44	0.80	0.51	158	082
1948-67 Legalized	0.55	0.79	2.26	1.55	311	186
19th C. legalized	0.71	0.73	1.34	1.07	089	084
Never illegal	0.90	0.88	1.71	1.36	090	094
All	0.37	0.50	1.03	0.66	178	106
Same Current & Birth State						
Loving states	0.17	0.23	0.50	0.31	194	117
1948-67 Legalized	0.56	0.80	2.05	1.44	266	156
19th C. legalized	0.52	0.45	0.80	0.68	054	078
Never illegal	0.87	0.88	1.18	1.03	036	034
All	0.25	0.32	0.69	0.46	176	116

Source: 5% IPUMS, the 1980 U.S. Census data. The sample is restricted to all U.S.-born black males aged 15-80 in their first marriages. Black-Other Race Interracial marriage rate for black males defined is the ratio of black males married to American Indian, Alaskan Native, Asian, Pacific Islander or other race spouses to the ratio of all black married men in their first marriages. D.C. is excluded from the sample. The "After" period spans the 13 years from 1967 till 1980. The first of the two "Before" periods spans 53 years from 1913 to 1967, and the second one spans 13 years from 1954 to 1967.

Table 3.4: Destination Choices of Black Males: Marginal Effects After Multinomial Probit

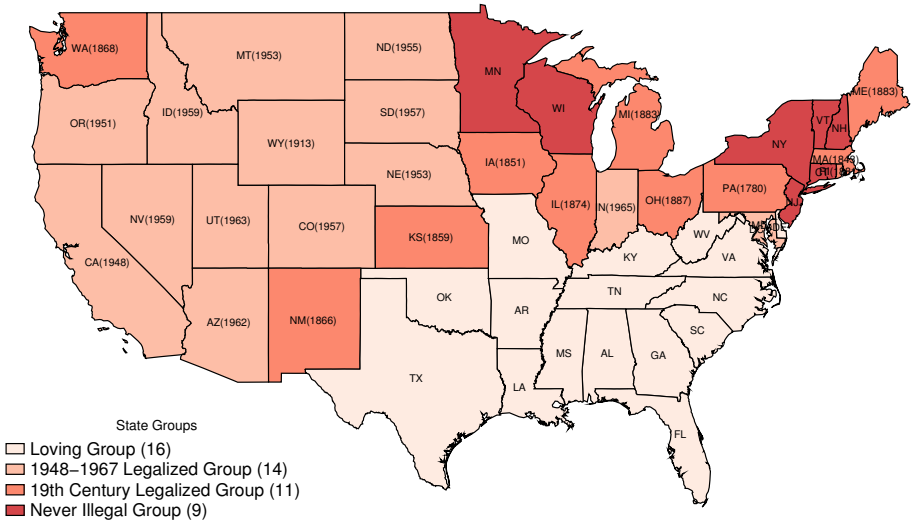
	Current State of Residence (Dependent variables)			
Independent variables	*Loving* states	1948-1967 Legalized	19*th* Century legalized	Never illegal
Born in...				
Loving states	.526**	−.604**	.053**	.024**
	(.007)	(.007)	(.007)	(.005)
19^{th} Century legalized	−.274**	−.163**	.496**	−.059**
	(.014)	(.001)	(.014)	(.005)
Never Illegal	−.277**	−.147**	−.125**	.548**
	(.015)	(.001)	(.006)	(.016)
White Wife	−.052	−.012	−.009	.074
	(.077)	(.027)	(.052)	(.048)
White Wife×Born in...				
Loving states	−.289**	.193**	.084	.012
	(.065)	(.050)	(.063)	(.037)
19^{th} Century legalized	−.0005	.089+	−.074+	−.014
	(.086)	(.052)	(.042)	(.037)
Never illegal	−.119	.153*	.043	−.068**
	(.099)	(.068)	(.073)	(.020)
(Age≤31)	.082**	.016+	−.021	−.077**
	(.020)	(.008)	(.015)	(.010)
(Age≤31)×Born in...				
Loving states	.070**	−.054**	−.036*	.020
	(.020)	(.007)	(.015)	(.015)
19^{th} Century legalized	−.053*	−.029**	.061**	.022**
	(.025)	(.009)	(.020)	(.017)
Never illegal	.024	−.020	−.042*	.038*
	(.027)	(.012)	(.019)	(.018)
(Age≤31)×White Wife	−.141	.012	.127	.002
	(.096)	(.038)	(.085)	(.049)
(Age≤31)×White Wife×Born in...				
Loving states	.148+	−.035	−.078	−.035
	(.086)	(.033)	(.051)	(.040)
19^{th} Century legalized	.125	−.015	−.088+	−.021
	(.100)	(.044)	(.051)	(.051)
Never illegal	.057	−.025	−.032	.0004
	(.122)	(.046)	(.080)	(.058)
Predicted Probability	.559	.127	.198	.115
χ^2 (Pr>χ^2)	48,095 (<.001)			
Log Pseudolikelihood	-121,555			
Number of Observations	130,117			

Table 3.4: (continued)

	Current State of Residence (Dependent variables)			
Independent variables	*Loving* states	1948-1967 Legalized	19*th* Century legalized	Never illegal
Other Race Wife	.104	$-.056^{+}$	.0004	$-.049$
	(.093)	(.028)	(.076)	(.044)
Other Race Wife×Born in...				
Loving states	$-.354^{**}$	$.320^{**}$	$-.013$	.047
	(.073)	(.088)	(.072)	(.085)
19^{th} Century legalized	$-.064$	.147	$-.120^{**}$	.036
	(.127)	(.094)	(.045)	(.095)
Never illegal	$-.221$	$.256^{*}$	$-.026$	$-.008$
	(.142)	(.125)	(.098)	(.072)
(Age≤31)×				
Other Race Wife	$-.295^{*}$	.005	$-.015$	$.305^{+}$
	(.129)	(.064)	(.106)	(.168)
(Age≤31)×Other Race Wife×Born in...				
Loving states	.177	$-.036$	$-.054$	$-.087^{**}$
	(.127)	(.053)	(.096)	(.030)
19^{th} Century legalized	$.264^{*}$	$-.036$	$-.135^{*}$	$-.093^{**}$
	(.112)	(.066)	(.057)	(.028)
Never illegal	.245	$-.084^{+}$	$-.049$	$-.112^{**}$
	(.151)	(.043)	(.134)	(.006)
Age	$-.004^{**}$	$.0008^{**}$	$.002^{**}$	$.0004^{**}$
	(.0001)	(.0001)	(.0001)	(.0001)
Education	$-.023^{**}$	$.011^{**}$	$.007^{**}$	$.004^{**}$
	(.0003)	(.0003)	(.0003)	(.0002)
Predicted Probability	.559	.127	.198	.115
χ^2 (Pr>χ^2)	48,095 (<.001)			
Log Pseudolikelihood	-121,555			
Number of Observations	130,117			

Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels. The group of black males who were born in 1948-1967 Legalized states is the reference category in birth state group. Black males married to black spouses make up the reference category in the spousal race group. The results reported for the multinomial probit estimations are marginal effects rather than coefficients.

Figure 3.1: States Grouped by the Time of Their Bans of Anti-Miscegenation Laws



Chapter 4

Human Capital and Black-White Interracial Marriage

This study focuses on interracial marriages between non-Hispanic blacks and whites in the U.S. to answer the following questions: (1) How does human capital affect interracial marriage decisions? (2) How do different distributions of educational attainment by blacks and whites affect the Interracial Marriage Probability (IMP) for black males? (3)What are the implications of increasing individual educational attainment on this probability?

Existing studies focus mainly on the determinants of black-white marriages. One line of research aims to understand distinctive patterns of black-white marriages in the U.S. [Tucker and Mitchell-Kernan (1990), Qian (1997), and Model and Fisher (1992)]. Their main result is that black males are more likely to be married outside of their race than are black females.[1] The black male (female) Interracial Marriage Rate (IMR or the Exogamy rate) is the ratio of black males (females) with white spouses to the total number of married black males (females).[2]

[1]Merton (1941) explains the higher IMR for black males with his status exchange theory. Gullickson (2005) compares current theories on educational characteristics of interracially married black-white couples and finds partial support for this status exchange theory.

[2]The focus will be on heterosexual marriages.

Figure 4.1 plots IMRs for black males and black females for the period 1962-2005. IMR calculations are based on prevalence rather than incidence of these marriages, since it is impossible to identify the year of marriage from the Census data.[3] Figure 4.1 shows that while the black male and the black female IMRs were almost the same in 1962, the black male IMR has been much larger than the black female IMR in all subsequent years. The IMRs for both black males and black females have steadily increased from 1962 to 2005.[4] In 1962 only 0.7 percent of the married black males had white spouses, while in 2005, 6.64 percent had white spouses. Although this IMR is low, it has risen 9.5-fold since 1962. Compared to black males, the black female IMR is much lower, 3.2 percent in 2005. Nevertheless, the black female IMR has increased more than five-fold since 1962.[5]

In Figure 4.1, the black male (female) IMR is calculated as the ratio of black males (females) with white spouses to all married black males (females). Charles and Ming (2006) find that high incarceration rates for black males limit their availability for marriage by different amounts in different marriage markets. The black male marriage rate has decreased due to high incarceration rates; therefore, even if equal numbers of black males marry white females, the

[3]The 2000 Census data is considered, and it does not provide details regarding the year of marriage.

[4]1962-2005 CPS March Supplements data are used. Because individuals with Hispanic origin cannot be identified for 10 years in CPS, the black male group includes both hispanics and non-hispanics. Based on the 2000 Census data summary file 1, I calculate that hispanics constitute a small group in the overall black population. Only 2.4 percent of blacks are Hispanics (U.S. Census Bureau [2000]).

[5]The IMR for black females in 1962 was around 0.6 percent.

dramatic increase in black male IMR can be explained on this basis.

Figure 4.2 plots IMRs for black males and black females using an alternative definition for IMR, the ratio of the number of black males with white spouses to all black males. The IMR for black males under this definition points to a six-fold increase from 1962 to 2005 (0.4 percent in 1962 to 2.4 percent in 2005). For black females this IMR definition amounts a three-fold increase (0.3 percent in 1962 to 0.9 percent in 2005). Regardless of the IMR definition used, the data reflect a trend toward increasing frequency of black-white interracial marriages.

I consider education (proxied by years of schooling) rather than individual earnings as a determinant of IMP for two reasons. First, individual education has a large predictive effect on future earning ability. Many people marry young, and they do not observe the future earnings of a potential spouse; rather they form expectations based on education and other unobservables. Second, Wong (2003a, 2003b) finds that education is a more desirable spousal feature than earnings for black males, while earnings are more desirable for white males.[6]

To understand the ways through which education may affect IMP, I borrow Furtado's (2006) classification of mechanisms through which human capital may affect interethnic marriages between immigrants and natives in the U.S. Human capital may affect the decision to marry interracially through

[6]Wong (2003a, 2003b) uses a structural matching model that allows for marital sorting and utilizes individual preferences.

two mechanisms.[7] The first asserts that an increase in individual education may directly increase the IMP due to exposure to more diverse environments. I call this the *racial adaptability effect*. According to the racial adaptability effect, the IMP is expected to be higher for more educated people, since they are expected to be more comfortable sharing a household with someone of a different race. Demo and Hughes (1990) find that interracial interactions during childhood and adolescence, and higher socioeconomic status have negative impacts on in-group attachment for blacks. In addition to this, Schuman et al. (1997) find that interracial marriages and opposition to anti-miscegenation laws relate positively to education level among whites. These two studies affirm that education may change both blacks' and whites' perceptions and attitudes towards other races.

The second mechanism that may affect IMP is the *assortative mating effect*. This effect predicts that if an individual prefers a highly educated spouse of the same race, s/he may be willing to give up racial similarities for similarities in education. For instance, in the case of a highly educated black male, if it is less likely for him to find a highly educated black spouse than to find a highly educated white spouse, he may be willing to marry a highly educated white female. The assortative mating effect of education states that as individual educational level increases, exogamy should increase for members of groups with lower average education, controlling for dispersion

[7] Furtado (2006) mentions three mechanisms. See Furtado for the full classification.

of educational attainment.[8]

In the interethnic marriage context, Furtado (2006) focuses on effects of different educational distributions of immigrants of different ethnicities in the U.S. and their interethnic marriage probabilities. Furtado (2006) uses a simple one-sided matching model and incorporates a positive premium that depends negatively on individual education in the utility function if an immigrant marries someone of the same ethnicity. The theoretical part of the current study builds on a two-sided matching model with inter- and intra-group heterogeneity. The model falls in the class of long-term partnership formation in the matching literature [Burdett and Coles (1997), (1999)]. However, this model introduces (1) within- and between-group heterogeneity in education, and (2) a distaste factor for a spouse of another race. This model follows Wong's (2003a), which incorporates a constant marriage taboo in a two-sided matching model to explain very low black male interracial marriage rates.[9] Unlike Wong, I assume that distaste for a partner of another race is not constant, but rather it is a function of individual education.

I seek to understand the relative importance of the mechanisms through which human capital may affect black-white interracial marriages.[10] Even

[8]This statement is based on the assumption that average education summarizes the different educational distributions in this context.

[9]Wong's structural estimation results show that if there were no mating taboo for different race spouses, the 5.5 percent black male interracial marriage rate in 1990 would be 64 percent, still much lower than random intermarriage rate which would be 85.4 percent in the 1990 Census. The random intermarriage rate (the encounter rate) would prevail in the absence of selection or friction in the marriage market.

[10]Intraracial marriage and endogamous marriage are used interchangeably; likewise inter-

though various aspects of black-white interracial marriages have been investigated before, the connection between education, the decision to marry someone of another race, and the role of different geographical educational distributions of races has never been modeled and empirically examined. An important contribution of this study is that it examines the geographical variation of black and white educational distributions to understand the role of education in the black male IMP. I find that individual education plays important role in the IMP for a black male. However, when the education distributions of blacks and whites are considered, the direct effect of individual education becomes insignificant in explaining the IMP.

4.1 Data Set

I use the 5 percent sample of Integrated Public Use Microdata Series (IPUMS) of the 2000 U.S. Census Data. The sample is restricted to non-Hispanic blacks and whites who are between the ages of 25 and 54. The married group is identified as married individuals currently living with their spouses. Endogamous marriage refers to heterosexual marriages within a race, and exogamous marriage in this context refers to heterosexual marriages between blacks and whites.

Defining a marriage market is a very hard task. The proper definition should focus on one's social network, but the Census data do not pro-

racial marriage and exogamous marriage are used synonymously.

vide sufficient information to identify social networks. This study defines a marriage market as the metropolitan area where a person lives.[11] Previous research shows that metropolitan areas approximate marriage markets well.[12] I consider assortative mating with respect to race and gender in the case of metropolitan areas. One should be cautious about using any variable that considers variation based on metropolitan areas. This is because, in the 5 percent sample of 2000 IPUMS data, 35 U.S. metropolitan areas were incompletely identified by more than 10 percent.[13] The main results of this study are robust to changes in the sample size when these 35 metropolitan areas are dropped. The metropolitan areas with fewer than 50 people in any gender-race group are dropped from the analysis, because their inclusion may cause imprecision in the variables that capture the educational distributions.

Table 4.1 shows the average education of interracially and intraracially married black males, black females and their spouses. The education gap between inter- and intraracially married black males is less than six months (0.45 years). On average, black males with white spouses are more educated than those with black spouses. Furthermore, the education gap between black males and their white spouses is less than the education gap between black males and their black spouses.

[11] I also considered alternative definitions of the marriage market to establish the robustness of the results. These include state of residence and birth state.

[12] Gould and Paserman (2003) find that majority of the population does not often move across metropolitan areas.

[13] See IPUMShttp://usa.ipums.org/usa/volii/incompmetareas.shtml.

4.2 Theory: A Two-Sided Matching Model

This section introduces a spousal search model to understand how human capital may affect the probability of black-white interracial marriages. The model used here follows Wong (2003a), but it builds on the role of individual traits in the discounting of interracial marriage output. As an individual's education increases, one expects the probability of exogamy to increase. This is due to a greater exposure to a more diverse environment, which this study calls the racial adaptability effect. The second one is the assortative mating effect, which takes the differences in the education distributions of the two racial groups into consideration.

Preference for a highly educated spouse who is of the same race is incorporated in the model, and the utility function reflects this trade-off. The assortative mating effect of education implies that, as the education of an individual increases, the probability of exogamy increases if he is from a racial group with a lower mean education, controlling for education standard deviations. This effect translates into an interesting result: if the spatial distribution of educational attainment varies between racial groups, the exogamy rates of highly educated black males should be higher for a metropolitan area having a higher white-black education gap.

4.2.1 Environment

Assumptions include a constant population with total mass equal to one, with agents either married or single with a common discount rate of

$\beta > 0$. There are two different race groups, $r = b, w$ (blacks and whites). The population of races is exogenous, and there are α blacks and $(1-\alpha)$ whites. The proportion of single blacks to all singles is π, which is endogenously determined at equilibrium. The fraction of people belonging to race r, who are single, is p^r. Therefore, $\pi = \alpha.p^b/[\alpha.p^b + (1-\alpha).p^w]$.

Agents care about the race and the education level of a prospective spouse. A_{bi}/A_{bj} stands for the education level of a black male/female, and A_{wi}/A_{wj} is the education level of a white male/female.[14] Intra-group heterogeneity is assumed, hence agents in any racial group are *ex ante* different. The education of a male of race r is $A_{ri} \in [\underline{A}_r, \overline{A}_r]$, for all r. When single, $Z_{ri} = A_{ri}$ is an agent's utility that depends on individual education level. If the agent is married to someone of the same race, instantaneous utility is assumed to be an equal split of match production, which is the product of the education levels, $Z_{ri} = (A_{ri}A_{r'j})/2$, for $r = r'$. Furthermore, if the agent is married to someone of another race, his utility is as follows: $Z_{ri} = [A_{ri}\big(A_{r'j} - \theta(A_{ri})\big)]/2$, if $r \neq r'$.[15]

An equal split of marriage output is assumed. $\theta(A_{ri})$ captures the distaste for marrying someone of another race. This is a function of the edu-

[14]The subscript i stands for male and j is for female.

[15]For individuals to have an incentive to marry within their race, the incentive compatibility condition $A_{ri} \leq \frac{A_{ri}\underline{A}_{r'j}}{2}$, for $r = r'$, should be satisfied. The spousal education levels should be at least two years, $2 \leq \underline{A}_{r'j}$. Similarly for interracial marriage to occur, one needs $A_{ri} \leq \frac{A_{ri}\left(\underline{A}_{r'j} - \theta(A_{ri})\right)}{2}$, for $r \neq r'$. Hence, the minimum acceptable level of education for a spouse of other race should be $2 + \theta(A_{ri}) \leq \underline{A}_{r'j}$.

cation level of an individual.[16] The racial adaptability effect operates through the distaste function. I incorporate the racial adaptability by assuming that $d\theta(A_{ri})/dA_{ri} < 0$, for all r. The interracial marriage output is discounted less heavily as individual education level of the agent increases. Quite intuitively, as one gets more education, his/her distaste for interracial marriage decreases.

$F_b(.|A)$ is the distribution of education among single blacks, who will propose to a potential spouse of type A if they meet. $F_w(.|A)$ is the distribution of education among single whites who will propose to a potential spouse of type A if they meet. Further, the theoretical model assumes identical distributions for people of the same race: $F_{bi}(.|A) = F_{bj}(.|A)$ and $F_{wi}(.|A) = F_{wj}(.|A)$.[17] The distribution of education among all single people of race $r = b, w$ is $H_r(.)$, where $H_r(A)$ is the probability of a single of race r having, at most, A years of education. $H_r(A)$ and $F_r(.|A)$ are not necessarily identical.

4.2.2 Matching

Singles look for spouses. Blacks and whites have the same likelihood of meeting others. The arrival rate of opposite-sex singles is λ.[18] The model has the property of constant returns to matching function.[19] When two agents

[16]The implications of the model and the analytical solution do not change if $\theta(A_{ri})$ is assumed to be a positive gain to endogamous marriages rather than a racial distaste factor for interracial marriages.

[17]This is not a crucial assumption, but it is made to keep the model tractable. In the empirical section this assumption is relaxed.

[18]λ is independent of race and the number of participating singles.

[19]This assumption is important for the tractability of the model. It is not an unrealistic assumption, since the arrival rate of singles does not necessarily correspond to the proportion

meet, they observe each other's races and types. If they both propose, they form a match and leave the marriage market. If one of them does not propose, they go back to the marriage market. All marriages are destroyed at rate δ.[20] The exogenous separation rate assumption keeps the model tractable and realistic compared to the clone assumption.[21] The value of being single for a black male i, of type A_{bi} is $V(A_{bi})$.[22]

$$\begin{aligned}\beta V(A_{bi}) = A_{bi} + \lambda\pi Emax\big\{K(A_{bi}, z_b), V(A_{bi})\big\}+ \\ \lambda(1-\pi)Emax\big\{K(A_{bi}, z_w), V(A_{bi})\big\} - \lambda V(A_{bi})\end{aligned} \tag{4.1}$$

$K(A_{bi}, z_b)$ is the type A_{bi} black male's *ex ante* expected discounted value of being married to a black spouse of type $z_b \sim F_b(.|A_{bi})$. Similarly, $K(A_{bi}, z_w)$ is A_{bi}'s *ex ante* expected discounted value of being married to a white spouse of type $z_w \sim F_w(.|A_{bi})$. The *ex post* or realized values of endogamous and

of all singles in the population, but instead to the total number of singles one can meet in a given period.

[20]Different separation rates for endogamous and exogamous marriages could be assumed, but the main results are not affected. I make a common separation rate assumption.

[21]The clone assumption asserts that married couples leave the market and they are replaced by their identicals.

[22]The value of being single equals the instantaneous gain from being single, and the difference between the expected discounted value of being married to a black or a white, respectively.

exogamous marriages are $K(A_{bi}, A_{bj})$ and $K(A_{bi}, A_{wj})$ respectively.[23]

$$\beta K(A_{bi}, A_{bj}) = \frac{A_{bi}A_{bj}}{2} + \delta\big[V(A_{bi}) - K(A_{bi}, A_{bj})\big] \quad (4.2)$$

$$\beta K(A_{bi}, A_{wj}) = \frac{A_{bi}\big(A_{wj} - \theta(A_{bi})\big)}{2} + \delta\big[V(A_{bi}) - K(A_{bi}, A_{wj})\big] \quad (4.3)$$

Due to different returns to intra- and interracial marriages, agents have different reservation types for different races. A black male's (A_{bi}) reservation type for a black spouse is $R_{bi} = R_{bi}(A_{bi})$ and for a white spouse is $R'_{bi} = R'_{bi}(A_{bi})$. Equalizing intra- and interracial marriage outputs will give the relationship $R'_{bi} = R_{bi} + \theta(A_{bi})$.[24] The racial distaste factor makes the reservation type for a spouse of another race larger than the reservation type for a same-race spouse. The racial distaste factor $\theta(A_{bi})$ decreases as individual education increases.

The acceptance set of a black male for a black female (A_{bj}) is, $A_{bbi} = \{j|A_{bj} \geq R_{bi}\}$, whereas, for a white female it is $A_{bwi} = \{j|A_{wj} \geq R'_{bi}\}$. While the reservation types give the minimum acceptable human capital levels for a spouse, the maximum attainable types are determined in equilibrium with the most desirable type of female who proposes. Equalizing the value of being single and the value of being married, one can get the optimal reservation spouse type:[25]

[23] They correspond to the instantaneous gains from a marriage and the differences between the expected discounted values of being single and being married, weighted by the exogenous separation rate.

[24] $\frac{A_{bi}A_{bj}}{2} = \frac{A_{bi}(A_{wj} - \theta(A_{bi}))}{2}$ will give $A_{wj} - A_{bj} = \theta(A_{bi})$, and as a result, one can get $R'(A_{bi}) - R(A_{bj}) = \theta(A_{bi})$.

[25] The reservation function is calculated as a fixed point of a contraction map.

$$\pi K(A_{bi}, R_{bi}) + (1-\pi)K(A_{bi}, R'_{bi}) \;\; = \;\; V(A_{bi}). \tag{4.4}$$

Substituting equation (4.2) and (4.3) in (4.4) gives:

$$\frac{A_{bi}R_{bi}}{2} \;\; = \;\; \beta V(A_{bi}). \tag{4.5}$$

Further substituting equation (4.5) into equation (4.1) results in the following equation,

$$\begin{aligned}\frac{A_{bi}R_{bi}}{2} =& A_{bi} + \frac{\lambda}{\beta+\delta}\Bigg\{\pi \int_{z\in A_{bbi}} \frac{A_{bi}(z-R_{bi})}{2} dF_b(z|A_{bi}) + \\ & (1-\pi)\int_{z\in A_{bwi}} \frac{A_{bi}(z-R_{bi}-\theta(A_{bi}))}{2} dF_w(z|A_{bi})\Bigg\}.\end{aligned} \tag{4.6}$$

See Appendix B for the definition of the steady state Nash equilibrium.

4.2.3 Racial Adaptability Effect of Education

Higher education institutions are among the major marriage markets, and they offer diverse environments. The racial adaptability effect states as educational level increases, the individual is exposed to a more diverse environment, and thus the distaste for a spouse of another race is expected to decrease. The racial adaptability effect works through the distaste factor and reservation types. The model implies that additional education will (1) increase the reservation type for the same race and (2) more importantly, decrease the reservation type for a spouse of another race. The next propositions illustrate (1) and (2).

Proposition 4.2.1. $\frac{dR_{bi}}{dA_{bi}} > 0$. *As individual education increases, the reservation type for a same-race spouse increases, and the acceptance set for a same-race spouse shrinks (see Appendix B for the proof).*

The following proposition builds a connection between an individual's educational level and his reservation type for a spouse of another race.

Proposition 4.2.2. $\frac{dR'_{bi}}{dA_{bi}} < 0 < \frac{dR_{bi}}{dA_{bi}}$ *always holds true (see Appendix B for the proof).*

Proposition 4.2.1 and 4.2.2 together imply that increasing one's own education causes the acceptance set to shrink from below for a same-race spouse. Furthermore, the rate at which a potential white wife is accepted increases with individual education. As a result, for a black male, the pace at which a potential white wife is accepted increases, while it decreases for a potential black wife, as individual education increases.

Proposition 4.2.3. $\frac{dPr(IMP)}{dA_{bi}} > 0$ *always holds true (see Appendix B for the proof).*

The interracial marriage probability of a black male can be written as:

$$Pr(IMP) = \frac{(1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})}{(1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) + \pi^* \int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})}.$$

The above equation represents the probability of interracial marriage of a black male. As an agent's educational level increases, the reservation type (minimum

acceptable level of spousal education) for a person of same race increases and the reservation type for a person of another race decreases. The lower limit of the integral of the second term in the denominator increases, whereas the lower limits of the first terms of the denominator and the numerator decrease. As a result, the probability of exogamy of a black male increases with education.

Propositions 4.2.1 and 4.2.2 have implications for reservation types. Also, Proposition 4.2.3 states that as one's education increases, the IMP increases. Even though everybody prefers a highly educated spouse, due to the symmetric nature of the problem, a highly educated spouse may not be attainable for people with fewer years of education, since they are less likely to be in the acceptance set of a highly educated potential spouse.

4.2.4 Assortative Mating Effect of Education

Non-identical black and white education distributions may affect the black-white IMPs. Assuming that individuals prefer to marry a highly educated spouse, if they are less likely to find such a spouse within their race, then they may choose to marry someone with high education over marrying someone of their same race.

The discount factor, $\theta(A_{bi})$, is the way in which the racial adaptability effect works. An increase in individual education lowers the reservation type for a spouse of another race and causes the IMP to increase. In order to see the effect of different black-white education distributions on interracial marriages, I assume that $\theta(A_{bi}) = 0$. The assumption is important, since in the presence

of the discount factor it is hard to distinguish between the effects of different education distributions and the effect of the distaste for a spouse of another race on IMP. This assumption implies that reservation types for same race and other race spouses are identical: $R_{bi} = R'_{bi}$.

The education levels are normally distributed for both blacks and whites: $A_{b\bullet} \sim N(\mu_b, \sigma_b^2)$ and $A_{w\bullet} \sim N(\mu_w, \sigma_w^2)$.[26] I also assume that the black education mean is, strictly, less than the white education mean ($\mu_b < \mu_w$), but they have the same education variances: $\sigma_b^2 = \sigma_b^2$.[27]

The next proposition states that due to non-identical education distributions, and given that the racial adaptability effect is shut down, the assortative mating effect implies that the probability of exogamy should be greater for a black man with a higher level of education.

Proposition 4.2.4. *Given $\theta(A_{bi}) = 0$, and there exists A^*_{bi}, such that $\underline{A}_b < R_{bi}(A^*_{bi}) \leq \kappa$ (where $\kappa = \frac{\mu_b + \mu_w}{2}$); the probability of exogamy increases with individual education $\frac{dPr(IMP)}{dA_{bi}} > 0$. (See Appendix B for the proof.)*

This proposition has important implications for the effect of a varying mean education gap between blacks and whites. Figure 4.3 is based on Furtado (2006). Here, given A_{bi}, if the reservation type, $R_b(A_{bi})$, is in some defined interval initially, as the mean education gap between whites and blacks ($\mu_w -$

[26] Normal distribution is assumed to simplify the exposition.

[27] This assumption reflects the current situation in the U.S., but it will be relaxed in the empirical section. Calculations based on the Census data show that $\hat{\sigma}_w = 2.64$, $\hat{\sigma}_b = 2.47$, $\hat{\mu}_w = 14.04$ and $\hat{\mu}_b = 12.92$.

μ_b) gets smaller - the black education distribution becomes similar to the white education distribution - the exogamy probability will decrease with individual education. Therefore, as a black male's education level increases, the exogamy probability becomes higher in a city where the average education gap is larger. Given a mean education gap between whites and blacks in a geographical area, as an individual from the lower mean education group (blacks) gets more education, his IMP increases.

4.3 Empirical Model

4.3.1 Racial Adaptability v. Assortative Mating Effect

This section presents various specifications to test the empirical implications of the theoretical model. Here the focus is only on black male/white female marriages.[28] The racial adaptability effect can be captured by measuring the marginal effect of education (in years) on IMP. The IMP is an indicator variable that takes on value one if a black male is married to a white female. Racial adaptability is present if the coefficient of the years of education variable is positive and statistically significant. The assortative mating effect takes the education distributions of blacks and whites into account, while the racial adaptability effect only focuses on individual education. If the assortative mating effect matters, the mean educational levels and education standard deviations of different races should matter.

[28]Black female/white male marriages are excluded from the analysis, as the low IMR for black females (around 2% in 2000) may cause insignificant estimates.

The implications of the assortative mating effect are tested by including variables that can capture the education distributions of blacks and whites. The variable set includes education means and standard deviations for blacks and whites, and the mean education gap and its interaction with individual education. If the coefficients of the variables defining the education distributions are significant, while the coefficient of individual education no longer is, then one can conclude that racial adaptability is dominated by the assortative mating effect.

To understand the relative importance of these effects I estimate various versions of the following model:

$$\begin{aligned} IMP_{bij} = 1[&\psi edu_{bij} + \phi_1 \overline{edu}_{bj} + \phi_2(\overline{edu}_{bj} \times edu_{bij}) + \theta_1 \overline{edu}_{wj} + \\ &\theta_2(\overline{edu}_{wj} \times edu_{bij}) + \gamma_1 \sigma_{bj} + \gamma_2 \sigma_{wj} + X_{bij}\beta + \varepsilon_{bij} > 0] \end{aligned} \tag{4.7}$$

The educational level of a black male who resides in metropolitan area j, is given by edu_{bij}. The variables, $\overline{edu}_{bj}$ and $\overline{edu}_{wj}$, are the mean educational attainments, and σ_{bj} and σ_{wj} are the standard deviations of blacks' and whites' education respectively (in j). I also include the interaction terms of edu_{bij} with $\overline{edu}_{bj}$ and $\overline{edu}_{wj}$. Finally, X_{bij} is a vector of variables that includes age, sex ratios, three indicator variables for region of residence, total population and population by gender and race in the metropolitan area.[29]

Table 4.2 shows the marginal effects evaluated at the sample averages

[29]The West is the excluded region.

after estimating four versions of equation (4.7). While the first two columns of Table 4.2 show the racial adaptability effect in isolation, the third and the fourth columns introduce the assortative mating effect of education. In addition to these variables, starting with the second specification, the education standard deviations, population variables, the number of available black males and females, and four different measures of sex ratios in metropolitan areas are added to the model.[30] The third specification adds mean education for blacks and whites and their interactions with edu_{bij} to the regressor set of the second specification. Finally, the fourth specification augments the second one with the white-black mean educational gap by metropolitan areas and its interaction with an individual's education.

The first column of Table 4.2 implies that, as the educational attainment of an average black male with approximately 13.3 years of education increases by one year, the IMP increases by almost 0.4 percentage points. This effect is substantial given the 6.6 percent IMP for black males. Without controlling for education distributions, I cannot reject the presence of the racial adaptability effect of education on a black male's IMP. As expected, age has a negative and the quadratic of age a positive coefficient. Compared to the West, exogamy is less likely in the Northeast and the Midwest, and it is least likely in the South.[31]

[30]The "available individuals" are defined as those who are not currently married. The black male/black female, the black male/white female, the white male/black female, and the white male/white female sex ratios are calculated for each metropolitan area.

[31]This may be due to historical reasons. Gevrek (2008) shows that in the 16 southern

The second specification shows that even after controlling for the standard deviations of education and population characteristics of metropolitan areas, individual education has a positive coefficient that is highly statistically significant. The standard deviations of education for blacks and whites are not statistically significant, and they also do not affect the coefficient of individual education. The IMP for a black male is lower in bigger cities. For instance, if the total population in an average metropolitan area increases by 100,000, the IMP decreases by approximately 6 percentage points. A marginal rise in the total black male population or a marginal drop in the total black female population increases the black male IMP by the same magnitude, for an average black male. The coefficient of the black male/black female sex ratio is not statistically significant. On the other hand, the black male/white female, the white male/black female, and the white male/white female sex ratios have significant coefficients.

In the third column of Table 4.2, the coefficient of education becomes statistically insignificant. Therefore, individual education does not directly affect the IMP; rather, it works through its interaction with the mean education of blacks and whites in a metropolitan area. The effect of individual education on the IMP is $-.0033 + (-.0031 \times \overline{edu}_{bj}) + (.0032 \times \overline{edu}_{wj})$. As an average black male's education increases by one year, an increase in the mean black

states where anti-miscegenation laws were struck down by the U.S. Supreme Court in 1967, the IMR has always been lower than in those states where (1) interracial marriage was never illegal or (2) it was legalized before the Supreme Court decision. See Fryer (2007) for the careful analysis of the trends in interracial marriage during the 20th century.

education in his metropolitan area will decrease his IMP by 0.31 percentage points. Conversely, for an average black male, an additional year of education coupled with an increase in the mean white education will increase his IMP by almost the same magnitude, i.e., 0.32 percentage points.

Figure 4.4 plots the education distributions of blacks and whites in two metropolitan areas. The highest mean educational gap between whites and blacks in the U.S. is in the Bryan-College Station, TX metropolitan area. Here the mean black education is 12.07 years and the mean white education is 14.87 years - a gap of 2.80 years. In this metropolitan area, if an average black male with a high school diploma acquires an additional year of education, his IMP increases by 0.7 percentage points. In contrast, the Bloomington-Normal, IL metropolitan area has the lowest educational gap in the U.S. Here the mean black education is 14.11 years and the mean white education is 14.13 years - a gap of 0.02 years. An additional year of education for an average black male in Bloomington-Normal, IL, decreases his IMP by 0.2 percentage points. These calculations reveal that an increase in the educational level of a black male will not always cause an increase his IMP due to the varying black and white education distributions.

The impact of a marginal increase in mean black education on the IMP depends negatively on a black male's education level: $.0538+(-.0031\times edu_{bij})$. Similarly, the effect of a marginal increase in mean white education on a black male's IMP depends positively on a black male's education level: $-.0332 + (.0032\times edu_{bij})$. The standard deviation of white education has a negative and

highly significant coefficient. In a metropolitan area with higher inequality of education among whites, the exogamy probability of a black male is higher. It is unclear whether this negative coefficient is due to a higher inequality in the education of white males or white females.

Given the significant coefficients on mean educational attainment and on the interaction terms, one expects that the mean educational gap between whites and blacks might be important in determining exogamy rates for black males. Whites in metropolitan areas have a higher mean education than blacks in an average of 99.85 percent of the observations. Instead of including the black and white education means separately, I simply include the mean educational gap. In Column 4, $(\overline{edu}_{wj} - \overline{edu}_{bj}) \times edu_{bij}$ has a highly statistically significant coefficient of 0.0032. Thus, given a positive mean educational gap, an additional year of education that an average black male attains will increase his exogamy probability by $(-.0004+.0032\times(\overline{edu}_{wj}-\overline{edu}_{bj}))$ percentage points. For instance, as an average black male gets one additional year of education, his IMP will increase by 0.86 percentage points in Bryan-College Station, TX, whereas, an observationally equivalent black male's IMP will decrease by 0.034 percentage points in Bloomington-Normal, IL.

The effect of a marginal increase in the mean educational gap on IMP depends positively on the educational level of a black male: $-.0357 + (.0032 \times edu_{bij})$. The greater the positive average educational gap between whites and blacks, the higher the IMP of a black male with additional years of education. This empirical finding is consistent with the model, which highlights the fact

that in areas with low average educational gaps, blacks and whites are more similar in terms of education. The effect of an increase in a black male's education will not be as high, because the likelihood of his finding a educationally similar black wife is greater.

The results in Table 4.2 show that the education distributions of two groups, blacks and whites, play an important role in a black male's IMP. Consider a distinction between gender and race that creates four different groups: black males, black females, white males and white females. In this case, I estimate the following equation.

$$\begin{aligned} IMP_{bij} = 1[&X_{bij}\beta + \psi edu_{bij} + \phi_{11}\overline{edu}_{bmj} + \phi_{21}\overline{edu}_{bfj} + \theta_{11}\overline{edu}_{wmj} + \\ &\theta_{21}\overline{edu}_{wfj} + \phi_{12}(\overline{edu}_{bmj} \cdot edu_{bij}) + \phi_{22}(\overline{edu}_{bfj} \cdot edu_{bij}) + \\ &\theta_{12}(\overline{edu}_{wmj} \cdot edu_{bij}) + \theta_{22}(\overline{edu}_{wfj} \cdot edu_{bij}) + \gamma_{11}\sigma_{bmj} + \\ &\gamma_{12}\sigma_{bfj} + \gamma_{21}\sigma_{wmj} + \gamma_{22}\sigma_{wfj} + \varepsilon_{bij} > 0] \end{aligned} \tag{4.8}$$

The dependent variable and edu_{bij} are defined identically. The mean educational attainments for black males (bm), black females (bf), white males (wm) and white females (wf) are $\overline{edu}_{bmj}$, $\overline{edu}_{bfj}$, $\overline{edu}_{wmj}$ and $\overline{edu}_{wfj}$ respectively. The standard deviations are defined similarly, where σ_{bmj}, σ_{bfj}, σ_{wmj} and σ_{wfj} are the education standard deviations of bm, bf, wm and wf respectively, in metropolitan area j. The rest of the variables in equation (4.8) are defined the same way.

Table 4.3 shows the estimation results based on this gender-race classification. The first column in Table 4.3 corresponds to the second specification

in Table 4.2. The coefficient of individual education is identical to that of Table 4.2, even after controlling for standard deviations of educational levels of bm, bf, wm and wf. In all specifications the coefficient of σ_{bmj} is negative and statistically significant. As educational inequality among black males increases, the IMP for a black male decreases. The coefficients of the bf, wm and wf standard deviations are generally not statistically significant.

As in the previous case, once the variables accounting for mean education for race-gender categories are included, the coefficient of individual education becomes insignificant. The second column reveals two important results. First, as the mean black male education increases by one year, the IMP for an average black male increases almost by 5 percentage points ($.0494 + .0005 \times edu_{bij}$). Second, when an average black male adds one more year to his education, his IMP depends on the bm and wf mean education levels positively; and it depends on the mean education of wm and bf negatively: $-.0017 + (.0005 \times \overline{edu}_{bmj}) + (-.0039^{**} \times \overline{edu}_{bfj}) + (-.0044 \times \overline{edu}_{wmj}) + (.0079^{**} \times \overline{edu}_{wfj})$. The positive coefficient of the mean of wf education is almost twice as large as the negative coefficient of the mean of bf education.

The remaining three specifications include variables for the mean educational gap between various gender-race groups and their interactions with individual education. The coefficient of the variable $(\overline{edu}_{wfj} - \overline{edu}_{bfj}) \times edu_{bij}$ is positive, and is the only significant educational gap coefficient in all three specifications. An increase in education level alone does not directly affect the IMP; rather, its effect depends on the mean educational gaps. If an average black

male gets an additional year of education, his IMP will positively depend on the wf-bf educational gap; and it will negatively depend on the wm-bm educational gap: $.0004 + .0050^{**} \times (\overline{edu}_{wfj} - \overline{edu}_{bfj}) - .0013 \times (\overline{edu}_{wmj} - \overline{edu}_{bmj})$. The fourth specification suggests that the wf-bf educational gap, $(\overline{edu}_{wfj} - \overline{edu}_{bfj})$ has a negative coefficient, while the bm-bf educational gap, $(\overline{edu}_{bmj} - \overline{edu}_{bfj})$ has a positive coefficient on black male IMP. In specification 5, $(\overline{edu}_{bmj} - \overline{edu}_{wfj})$ has a positive and marginally significant coefficient.

4.3.2 Robustness Tests

In this section, I provide different tests to see if the results are sensitive to the following: the definition of the marriage market, the assumption of assortative mating based on age groups, different sample sizes and the possible endogenous decision of moving into metropolitan areas. The Integrated Public Use Microdata Series (IPUMS)-USA warns users that some metropolitan areas are only partially identified in some Census years, including 2000. Table C.1 and Table C.2 replicate Table 4.2 and Table 4.3 respectively by omitting the metropolitan areas that are incompletely identified by more than 10 percent.[32] When these metropolitan areas are omitted, 5,439 and 5,427 observations are lost from the samples. Table C.1 and Table C.2 reveal that the main results are not affected if these metropolitan areas are excluded.

To see if the results are robust to the definition of the marriage market, I replicate Table 4.2 and Table 4.3 by assuming that the marriage market

[32]See Appendix C for Table C.1 and Table C.2.

is the current state of residence.[33] In this case, I calculate the education distribution variables for three different age groups: 25-34, 35-44 and 45-54. The introduction of assortative mating by age implies that the variations in variables that define education distributions arise from race, age, and state in Table C.3. In Table C.4, on the other hand, the variation arises from differences in race, age, state as well as in gender. The results in Table 4.2 are robust to this change in the definition of the marriage market and assortative mating with respect to age. The coefficients of the main variables of interest are quantitatively similar, although generally slightly larger in absolute value.

Table C.4 shows that the impact of the bm-wm mean educational gap on the black male IMP becomes significant, while the effect of the wf-bf education gap on black males' IMP is no longer significant. Although a state is not the best approximation to a marriage market, this exercise in Table C.3 shows that the results of Table 4.2 are almost unaffected. However, I get somewhat different results in Table C.4 (in which the variation arises from race, age, state, and gender) than in Table 4.3.

If highly educated interracially married black males tend to move to metropolitan areas with high average educational gaps, this endogenous moving may cause the higher IMRs in these areas. Calculating education distributions and sex ratios by using metropolitan areas of residence may cause endogeneity (see Angrist [2002]). The issue is addressed by re-estimating the

[33]See Appendix C for Table C.3 and Table C.4.

specifications of Table 4.2 and Table 4.3 using education distribution variables based on birth states. In Table C.5, variations in education distributions arise from race-age-birth state differences, while in Table C.6, variations arise from race-age-birth state and gender differences.[34] The results in Tables C.5 and C.6 are very similar to those of Table C.3 and Table C.4, where the marriage market is defined as the current state of residence. Since the educational distributions of blacks and whites by birth states have an almost identical impact on the black male IMP, it is very unlikely that endogenous moving decisions are generating the results of this study.

4.4 Conclusion

This study aims to answer the following questions: (1)Through which mechanisms does human capital affect interracial marriage decisions? (2)How do different black and white education distributions affect the IMP of a black male? and (3)What are the implications of increasing educational attainment?

I modeled and tested the mechanisms through which human capital may affect the probability of interracial marriages. The racial adaptability effect predicts that as educational attainment increases, the probability of interracial marriage increases, since the individual is exposed to a more diverse pool of marriage candidates. The assortative mating effect, however, takes education distributions of blacks and whites into account. For instance, given

[34]See Appendix C for Table C.5 and Table C.6.

that a highly educated black male prefers to marry a highly educated black female, if the probability of his finding a highly educated black female is lower than the probability of his finding a highly educated white female, he may be willing to trade racial similarities for educational similarities. The assortative mating effect predicts that the probability of exogamy is higher for a highly educated black man who resides in a relatively high mean white-black education gap metropolitan area, controlling for the dispersion of education.

I use a two-sided matching model with *ex ante* intra- and inter-group heterogeneity. Preference for a same-race spouse is captured by a term that discounts the interracial marriage output. The racial adaptability effect operates through the discount factor, which depends negatively on educational level of a black male. The empirical results suggest that the racial adaptability effect, which is captured by the marginal effect of individual education on IMP, is statistically significant in the absence of variables that define the educational distributions of blacks and whites. I find that individual education is important in explaining the black male IMP. An additional year of education increases the IMP for an average black male by 0.4 percentage points.

The direct effect of individual education vanishes, however, once one accounts for the differences in the distributions of education between blacks and whites. The probability of exogamy depends on the mean white and black educational levels and the mean educational gap in the geographical area. An additional year of education obtained by an average black male in the metropolitan area with the highest educational gap increases his IMP up

to 0.86 percentage points, while an additional year of education obtained by an average black male in the metropolitan area with the lowest educational gap decreases his IMP by 0.2 percentage points. The results suggest that differences in the distributions of education between blacks and whites have a direct effect on the rate of interracial marriage between those groups. The assortative mating effect of education is the dominant mechanism through which human capital affects black-white interracial marriages.

Marriages between different racial groups improve the health of the interracial interactions in a multiracial society. However, increasing the educational level of a black male will not always cause an increase in his IMP: that male's IMP depends on the relative education distributions of different races. Contrary to what is expected, as blacks and whites become more similar in terms of education, a highly educated black male's interracial marriage probability may not increase. Interracial marriages may not become more frequent as educational differences between races disappear.

Table 4.1: Average Educational Attainment

	Black Male	**Wife**	**Black Female**	**Husband**
Interracially Married	**13.42**	**13.59**	**13.95**	**14.04**
	(2.27)	(2.3)	(2.39)	(2.68)
	[6,237]	[6,237]	[2,125]	[2,125]
	6.54%		2.33%	
Intraracially Married	**12.97**	**13.33**	**13.33**	**12.97**
	(2.33)	(2.25)	(2.25)	(2.33)
	[89,191]	[89,191]	[89,191]	[89,191]
	93.46%		97.67%	

Source: The 5 percent sample of 2000 IPUMS U.S. Census data. The sample is restricted to the non-Hispanic blacks and whites aged 25 to 54. The educational attainment in years. Standard deviations are given in parentheses, and the number of observations are given in brackets.

Table 4.2: Effect of Human Capital on Interracial Marriage for Black Males: Marginal Effects After Probit Regression, Pooled Age, Variation in Distributions of Education by Metropolitan Areas and Race

	(1)	**(2)**	**(3)**	**(4)**
edu_{bij}	.0037**	.0035**	−.0033	−.0004
	(.0003)	(.0003)	(.0127)	(.0009)
$\overline{edu}_{bj} \times edu_{bij}$			−.0031**	
			(.0011)	
$\overline{edu}_{wj} \times edu_{bij}$			.0032**	
			(.0007)	
$\overline{edu}_{bj}$			.0538**	
			(.0165)	
$\overline{edu}_{wj}$			−.0332**	
			(.0106)	
$(\overline{edu}_{wj} - \overline{edu}_{bj}) \times edu_{bij}$				.0032**
				(.0007)
$(\overline{edu}_{wj} - \overline{edu}_{bj})$				−.0357**
				(.0107)
σ_{bj}		−.0047	−.0077	−.0097
		(.0057)	(.0062)	(.0062)
σ_{wj}		−.0050	−.0280**	−.0096
		(.0072)	(.0078)	(.0073)
Population				
Total×10^{-5}		−.0577**	−.0753**	−.0560**
		(.0117)	(.0118)	(.0116)
Black Male		.0001**	.0001**	.0001**
		(.00001)	(.00001)	(.00001)
Black Female		−.0001**	−.0001**	−.0001**
		(.00002)	(.00002)	(.00001)
Black Male Available		−.0001**	−.0001**	−.0001**
		(.00002)	(.00002)	(.00002)
Black Female Available		.0001**	.0001**	.0001**
		(.00002)	(.00002)	(.00002)
Mean of Dependent Predicted	.0730	.0730	.0730	.0730
Probability(at $\bar{x}$)	.0647	.0585	.0581	.0584
Observations (N)	88,819	88,819	88,819	88,819
Log Pseudo Likelihood	-22,042	-21,208	-21,167	-21,193
F-Stat:				
$\overline{edu}_{wj} = -\overline{edu}_{bj}$			2.34	
			(.126)	
$\overline{edu}_{wj} \times edu_{bij} = -\overline{edu}_{bj} \times edu_{bij}$			0.04	
			(.837)	

Table 4.2: (continued)

	(1)	**(2)**	**(3)**	**(4)**
Sex Ratio				
bm/bf		.0038	.0058	.0014
		(.0056)	(.0058)	(.0058)
bm/wf		$-.1590^{**}$	$-.1458^{**}$	$-.1583^{**}$
		(.0108)	(.0106)	(.0108)
wm/bf		$.0009^{**}$	$.0009^{**}$	$.0010^{**}$
		(.0001)	(.0001)	(.0001)
wm/wf		$.0681^{*}$	.0139	$.0653^{*}$
		(.0290)	(.0296)	(.0290)
Age	$-.0047^{**}$	$-.0045^{**}$	$-.0046^{**}$	$-.0045^{**}$
	(.0011)	(.0011)	(.0011)	(.0010)
Age^2	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$
	(.00001)	(.00001)	(.00001)	(.00001)
North East	$-.0499^{**}$	$-.0232^{**}$	$-.0158^{**}$	$-.0245^{**}$
	(.0016)	(.0030)	(.0034)	(.0029)
Midwest	$-.0443^{**}$	$-.0175^{**}$	$-.0080^{**}$	$-.0179^{**}$
	(.0017)	(.0030)	(.0035)	(.0030)
South	$-.1061^{**}$	$-.0408^{**}$	$-.0269^{**}$	$-.0411^{**}$
	(.0027)	(.0040)	(.0044)	(.0041)
Mean of Dependent	.0730	.0730	.0730	.0730
Predicted Probability(at $\bar{x}$)	.0647	.0585	.0581	.0584
Observations (N)	88,819	88,819	88,819	88,819
Log Pseudo Likelihood	-22,042	-21,208	-21,167	-21,193
F-Stat:				
$\overline{edu}_{wj} = -\overline{edu}_{bj}$			2.34	
			(.126)	
$\overline{edu}_{wj} \times edu_{bij} = -\overline{edu}_{bj} \times edu_{bij}$			0.04	
			(.837)	

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. Metropolitan areas with less than 50 observations in any gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Table 4.3: Effect of Human Capital on Interracial Marriage for Black Males: Marginal Effects After Probit Regression, Pooled Age, Variation in Distributions of Education by Metropolitan Areas, Race and Gender

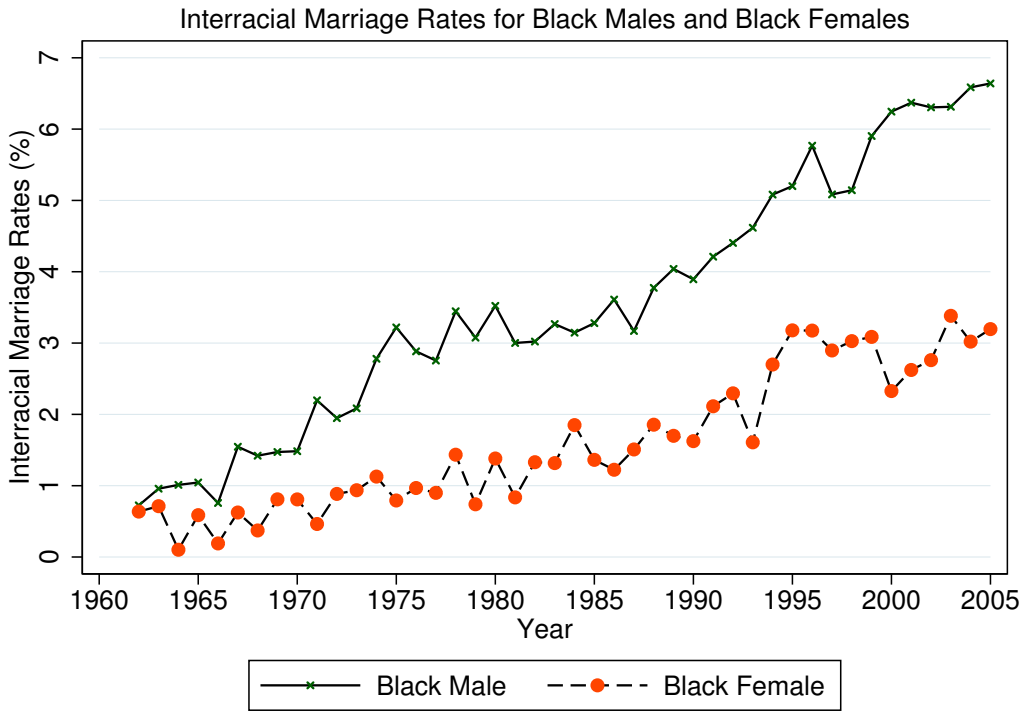
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
edu_{bij}	$.0035^{**}$	$-.0017$	.0004	.0001	0001
	(.0003)	(.0141)	(.0010)	(.0010)	(.0010)
$\overline{edu}_{bmj} \times edu_{bij}$		.0005			
		(.0018)			
$\overline{edu}_{bfj} \times edu_{bij}$		$-.0039^{+}$			
		(.0021)			
$\overline{edu}_{wmj} \times edu_{bij}$		$-.0044$			
		(.0033)			
$\overline{edu}_{wfj} \times edu_{bij}$		$.0079^{*}$			
		(.0034)			
$\overline{edu}_{bmj}$		$.0494^{+}$			
		(.0261)			
$\overline{edu}_{bfj}$		.0040			
		(.0294)			
$\overline{edu}_{wmj}$		.0193			
		(.0452)			
$\overline{edu}_{wfj}$		$-.0491$			
		(.0478)			
$(\overline{edu}_{wmj} - \overline{edu}_{bmj}) \times edu_{bij}$			$-.0013$	$-.0046$	$-.0046$
			(.0016)	(.0029)	(.0029)
$(\overline{edu}_{wmj} - \overline{edu}_{bmj})$			$-.0192$	.0393	.0393
			(.0228)	(.0398)	(.0398)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj}) \times edu_{bij}$			$.0050^{**}$	$.0080^{**}$	$.0038^{+}$
			(.0019)	(.0030)	(.0020)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj})$			$-.0134$	$-.0739^{+}$	$-.0054$
			(.0267)	(.0420)	(.0284)
$(\overline{edu}_{bmj} - \overline{edu}_{bfj}) \times edu_{bij}$				.0042	
				(.0030)	
$(\overline{edu}_{bmj} - \overline{edu}_{bfj})$				$.0794^{+}$	
				(.0425)	
$(\overline{edu}_{bmj} - \overline{edu}_{wfj}) \times edu_{bij}$					$-.0042$
					(.0030)
$(\overline{edu}_{bmj} - \overline{edu}_{wfj})$					$.0794^{+}$
					(.0425)
Mean of Dependent	.0716	.0716	.0716	.0716	.0716
Predicted Probability(at $\bar{x}$)	.0578	.0571	.0574	.0574	.0574
Observations (N)	88,296	88,296	88,296	88,296	88,296
Log Pseudo Likelihood	-20,806	-20,710	-20,740	-20,736	-20,736

Table 4.3: (continued)

	(1)	(2)	(3)	(4)	(5)
σ_{bmj}	$-.0170^{**}$	$-.0102^{+}$	$-.0166^{**}$	$-.0136^{**}$	$-.0136^{**}$
	(.0049)	(.0053)	(.0051)	(.0053)	(.0052)
σ_{bfj}	$.0105^{*}$	.0015	.0050	.0042	.0042
	(.0059)	(.0059)	(.0058)	(.0053)	(.0059)
σ_{wmj}	$-.0070$	$-.0307^{*}$	$-.0114$	$-.0124$	$-.0124$
	(.0126)	(.0129)	(.0127)	(.0126)	(.0126)
σ_{wfj}	.0063	.0200	.0144	.0174	.0174
	(.0146)	(.0145)	(.0145)	(.0144)	(.0144)
Population					
Total$\times 10^{-5}$	$-.0619^{**}$	$-.0521^{**}$	$-.0355^{**}$	$-.0372^{**}$	$-.0371^{**}$
	(.0117)	(.0120)	(.0119)	(.0119)	(.0119)
Black Male	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
Black Female	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$
	(.00002)	(.00002)	(.00002)	(.00001)	(.00001)
Black Male Available	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$
	(.000001)	(.00002)	(.00002)	(.00002)	(.00002)
Black Female Available	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$
	(.00001)	(.00002)	(.00002)	(.00002)	(.00002)
Sex Ratio					
bm/bf	$.0262^{**}$	$.0478^{**}$	$.0429^{**}$	$.0483^{**}$	$.0483^{**}$
	(.0070)	(.0078)	(.0075)	(.0079)	(.0079)
bm/wf	$-.1267^{**}$	$-.0967^{**}$	$-.1105^{**}$	$-.1061^{**}$	$-.1061^{**}$
	(.0102)	(.0100)	(.0100)	(.0101)	(.0101)
wm/bf	$.0020^{**}$	$.0016^{**}$	$.0017^{**}$	$.0017^{**}$	$.0016^{**}$
	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)
wm/wf	.0048	$-.0483$	.0050	.0084	$-.0085$
	(.0298)	(.0305)	(.0290)	(.0299)	(.0106)
Age	$-.0046^{**}$	$-.0046^{**}$	$-.0046^{**}$	$-.0045^{**}$	$-.0045^{**}$
	(.0011)	(.0011)	(.0010)	(.0011)	(.0011)
Age^2	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
North East	$-.0166^{**}$	$-.0073^{+}$	$-.0169^{**}$	$-.0146^{**}$	$-.0146^{**}$
	(.0032)	(.0038)	(.0032)	(.0034)	(.0034)
Midwest	$-.0067^{*}$	.0065	$-.0051$	$-.0035$	$-.0035$
	(.0033)	(.0041)	(.0033)	(.0034)	(.0034)
South	$-.0266^{**}$	$-.0111^{**}$	$-.0255^{**}$	$-.0236^{**}$	$-.0247^{**}$
	(.0039)	(.0043)	(.0038)	(.0039)	(.0039)

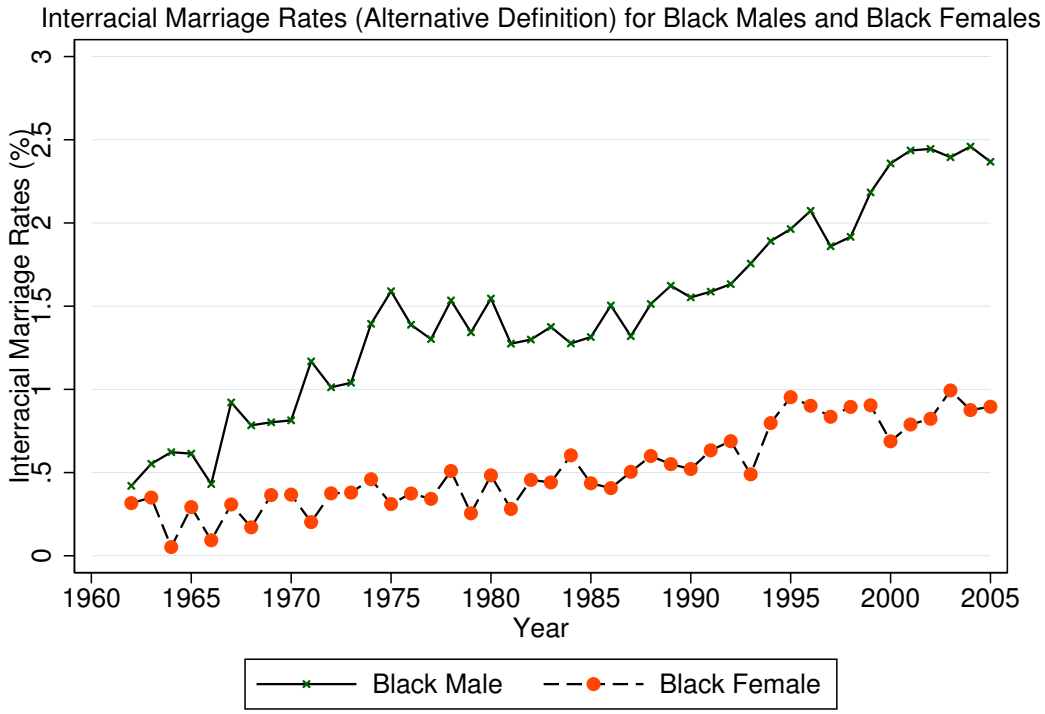
Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. Metropolitan areas with less than 50 observations in any gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Figure 4.1: Interracial Marriage Rates for Black Males and Females



Source: 1962-2005 Current Population Survey (CPS) March Supplement data are used to match spouses and to calculate IMRs. This sample contains individuals who are at least 16 years old. The IMR for a black male (female) defined as the proportion of black males (females) with white spouses to all married black males (females).

Figure 4.2: Interracial Marriage Rates for Black Males and Females (Alternative Definition)



Source: 1962-2005 Current Population Survey (CPS) March Supplement data are used. This sample contains individuals who are at least 16 years old. The IMR for a black male (female) defined as the proportion of black males (females) with white spouses to all (married spouse present, married spouse absent, separated, widowed, divorced and never married single) black males (females).

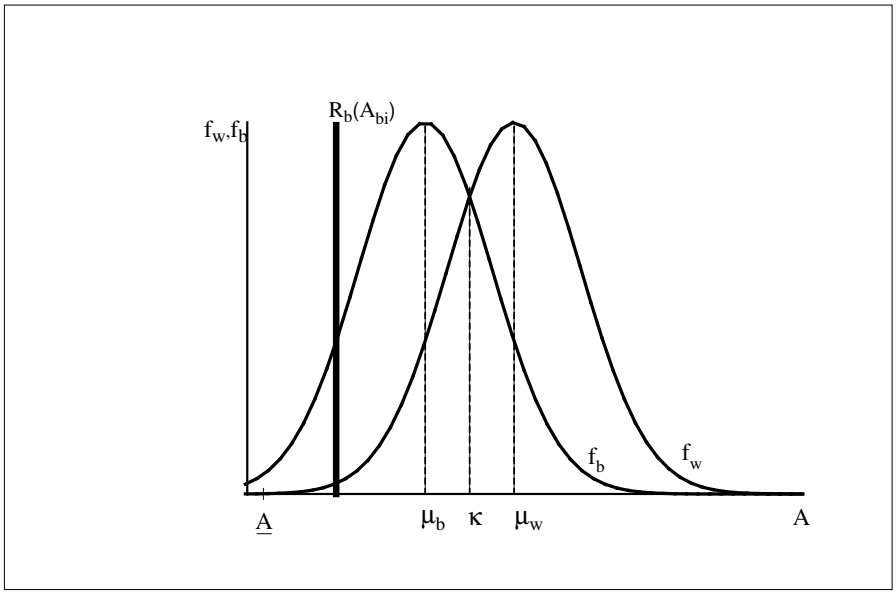
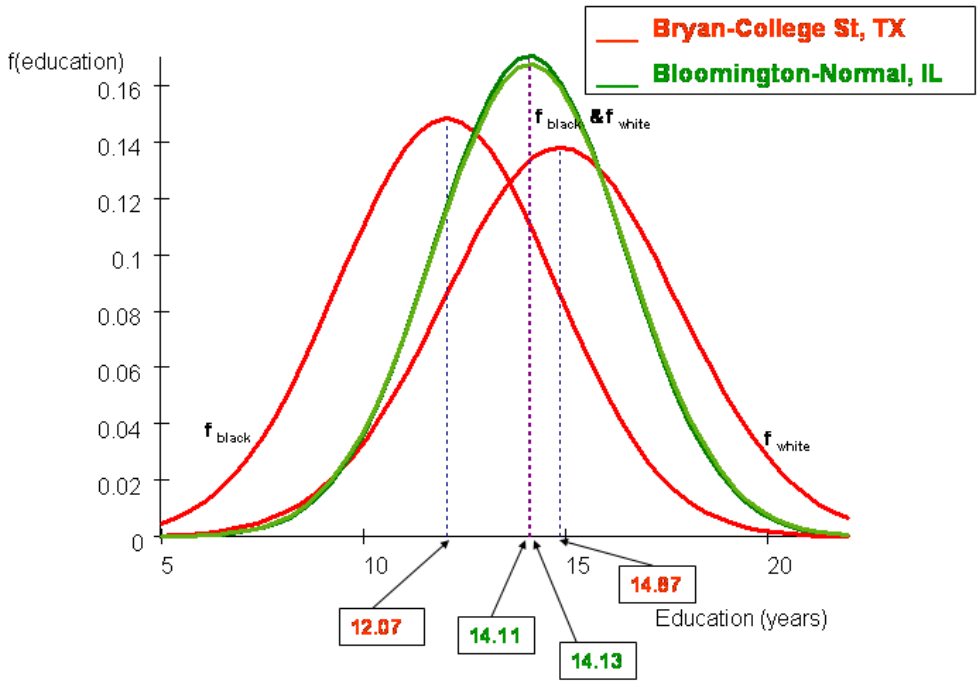


Figure 4.3: The Black and White Education Distributions

Figure 4.4: The Black and White Education Distributions for two Metropolitan Areas



Chapter 5

Summary and Directions for Future Research

Human capital accumulation, migration and family formation received significant attention from economists. This dissertation explores the role of parents, statutes and education in individual choices regarding college success, migration within the United States, and interracial marriage.

To gain a better understanding of the determinants of college success, Chapter 2 used a micro data set that the authors created by matching administrative records with survey responses of students in the College of Economics and Administrative Sciences of a private university in Turkey. The micro data set has very detailed information, including college GPA for each semester, scholarship status, post-graduation plans, number of younger and older siblings, family income, gender, age, year in college, the score on Turkish Central University Entrance Exam or the Student Selection Examination (SSE) score, college major, parental education and occupations, and family business characteristics. This data set provides a unique opportunity to control for many aspects of individual heterogeneity in studying the links between parental characteristics and children's choices and outcomes.

Chapter 2 shows that self-employed parents and family businesses gen-

erally have a negative impact on college students' GPAs. Interestingly, professionally employed parents do not adversely affect their offspring's college success. The results show that GPAs of male students with two self-employed parents or with only a self-employed mother are the lowest. Parental self-employment generally has a similar impact on female and male college students' GPAs. However, female students with only self-employed mothers have higher GPAs than those female students without any self-employed parents.

The theoretical model implies that the lower GPAs of the children of self-employed parents may stem from intergenerational ability transfers, better access to managerial and industry-specific human capital, or nepotism. Accounting for possible survey non-response bias and controlling for various characteristics, we find that students with self-employed parents are not only more likely to have entrepreneurial intent but also less likely to plan to attend graduate school.

Chapter 2 suggests that parental self-employment and family businesses affect the success and post-graduation plans of college students. Future studies may involve understanding the relative importance of intergenerational ability transfers, level of access to managerial and industry-specific human capital, and influence of nepotism in generating these effects of self-employed parents on their children's entrepreneurial intent and college success.

Another direction for further research is to investigate the role of sibling order and the number and gender of siblings on post-graduation plans and college success. The preliminary results based on this data set show that

the presence and number of older male and female siblings interact with the self-employment status of the parents to affect students' college success and post-graduation plans. For instance, while having only older sister(s) positively impacts college success of students with no self-employed parents, having only older sister(s) negatively impacts college success of those with self-employed parents. Interestingly, having only older brother(s) has no statistically significant effect on college GPAs of students without self-employed parents, while having only older brother(s) has a positive impact on the college GPAs of the students with self-employed parents.

Although cumulative college GPA serves as a good measure of college success, future work may utilize the panel data on GPAs and consider the standard deviation of a student's college GPA to measure consistency in reaching and sustaining target GPAs. Another line of research would involve studying the dynamic behavior of college students through college.

Chapter 3 focuses on the differential migration patterns of intra- and interracially married black males during the Great Migration in the United States among four different state groups categorized by the time of their ban on anti-miscegenation laws. This study finds that anti-miscegenation laws in individuals' states of birth affects the sorting of intra- and interracially married black males into destination states differentially. However, the younger generation of intra- and interracially married black males who entered the marriage market after the removal of anti-miscegenation laws has different migration patterns than the older generation of intra- and interracially married black

males.

In Chapter 3, the empirical analysis is based on triple-differencing, which involves interacting age, race of wife and the state of birth. Future studies may include consideration of the distances travelled between birth and destination states and differences in the relative supply of women of different races in both birth and destination states. Chapter 3 exclusively focuses on married black males, because interracial marriage is rarer for black females, which causes imprecise estimates for black females. However, studying the migration patterns of married black females may help to further our understanding of black/white relations. An important limitation of using the Census data for migration studies is that it is impossible to identify an individual's complete migration history. Unfortunately no longitudinal data set matches the sample size of the U.S. Census data. Nevertheless, one could use the information on recent migrants from the U.S. Census data to validate the results.

Chapter 4 uses a two-sided matching model to understand the role of education in black male/white female interracial marriages in the U.S. The empirical analysis shows that individual education has a positive effect on a black male's Interracial Marriage Probability (IMP) if one fails to control for variables that define the education distributions of blacks and whites in a marriage market. However, once one accounts for these variables, the coefficient of individual education is statistically insignificant, while its interaction with differences between the educational distributions of blacks and whites is highly significant. In particular, the IMP of a black male is especially strongly af-

fected by the mean differences in white and black education levels and the average education gap in the local marriage market. Chapter 4 suggests that differences in education distributions between blacks and whites are important in explaining IMP for a black male.

In Chapter 4, while I focus on the IMP of black males, it may be interesting to extend this analysis to black females. Future work could expand the analysis to include other types of relationships than marriage between members of different races. Low interracial marriage rates among blacks and whites are an indicator of the extent of legal partnership between these races. Along this line, investigation of the role of education on the probability of black/white cohabitation may help validate the results of this study. Going even further afield, with the advent of online indicators of social interaction (e.g., facebook.com), one might examine how racial aspects of these interactions are related to the distributions of racial characteristics across markets.

Appendices

Appendix A

The Survey Questionnaire of Chapter 2

Dear Friends,

We ask you to participate in our survey that is designed to understand the student profile. We want to investigate the determinants of academic achievement of college students of one of the best universities in Turkey. Please answer the questions correctly and as accurately as possible. The survey will take 5 minutes and your correct and full responses will help us to understand some student characteristics. No information provided by you will be seen by third parties except the two main researchers and submitted information will not be reported in a way that third parties can identify individuals. After matching the student data with the academic records, the names will be erased.

1. First and last name:

2. School number:

3. Age:

a)17 b)18 c)19 d)20 e)21 f)22 g)23 h)24+

4. Gender: a) MALE b) FEMALE

5. Please write number of siblings you have:

I have .....Male;.....Female siblings.

6. Please write the ages of your BROTHERS (if it applies to you):....;....;....;....;.....

7. Please write the ages of your SISTERS (if it applies to you):....;....;....;....;....;....;.....

8. Does your family have any kind of business? a) YES b) NO

9. Did you go to the English Preparation class in University?

a) YES b) NO

10. Not counting the English Preparation year, Fall 2006 is your.....semester (please circle the correct semester).

a) 1st b) 2nd c) 3rd d) 4th e)5th f)6th g)7th h) 8 +

11. After graduating from college, I plan to:

a) Work in the family business.

b) Start a new business.

c) Work as an employee.

d) Work as an employee first and then work in the family business.

e) Work as an employee first and then start a new business.

f) Go to graduate school.

g) Other.

Consider your answer to the previous question and please write your post-graduation plans if you were asked these questions in the semester/time period below (Example: Ayse was planning to work in the family business during her first year but she changed her plans in her second year and in the third year with going to graduate school. In this case she would answer this question as follows:

$1^{st}Year$ a $\quad$ $2^{nd}Year$ f $\quad$ $3^{rd}Year$ f)

Please leave it blank for the semesters you were not enrolled.

12.	**13.**	**14.**
$1^{st}Year$	$2^{nd}Year$	$3^{rd}Year$
a)	a)	a)
b)	b)	b)
c)	c)	c)
d)	d)	d)
e)	e)	e)
f)	f)	f)
g)	g)	g)

15. If you have a family business, please write the total number of people (including those holding managerial posts) working in this business:.....

16. If you have a family business, please write the TOTAL number of people from the family who are working in the business:.....

17. If you have a family business, please write the number of people involved in it at **managerial positions** who are NOT from the family:.....

18. If you have a family business, please write the number of people who ARE from the family and who work in **managerial positions**:.....

19. Did you succeed in your first try at the University Entrance Exam (SSE)?

a) YES b) NO

20. What is your current GPA (as of the end of the last semester?) .....

21. What was your English proficiency when you completed high school?

a) Beginner. b) Intermediate. c) Advanced.

22. What was your university entrance exam score corresponding to the area (EQUALWEIGHT2)? .....

23. Please fill in the circle corresponding to your major.

◯ Business Admin.	◯ Business Economics	◯ Economics
◯ Econ.& Managemnt Honors	◯ Economics Honors	◯ Int'l Finance
◯ International Relations	◯ Government	

Academic year fellowship/scholarship: Please circle the one fits you.

Question Number→	**24.**	**25.**	**26.**	**27.**
	2006/2007	2005/2006	2004/2005	2003/2004
a) None	a)	a)	a)	a)
b) Turkish Edu. Ministry	b)	b)	b)	b)
c) University Merit F.	c)	c)	c)	c)
d) University Sports, Art F.	d)	d)	d)	d)
e) Other Fellowships.	e)	e)	e)	e)

28. Pick the type of high school you graduated from:

a) Private (English)	f) Public Anatolian (English)
b) Private (Other Lang.)	g) Public Anatolian.(Other Lang.)
c) Private Science.	h) Public Science.
d) Private Other.	i) Public Super.
e) Regular Public (Straight.)	j) Public Other.

29. Please rank the statement below from 1 to 5 (eg. 1= I totally disagree, 5=totally agree.)

• I take notes in classes:.....

• If you have a family business: I believe that my education will help me in the family business:.....

• If you are planning to start a new business: I believe that my education will help me in my future business:.....

30. On average how many hours a day do you study?.....

31. On average how many hours a day do you sleep?.....

32. Which group does your yearly family income fall into?

a) 0-20 thousand YTL

b) 20-40 thousand YTL

c) 40-60 thousand YTL

d) 60-80 thousand YTL

e) 80-100 thousand YTL

f) 100-120 thousand YTL

g) 120-140 thousand YTL

h) 140-160 thousand YTL

i) 160+ thousand YTL

Please choose the education level of your;

Question Number→	**33.**	**34.**
	MOTHER	FATHER
a) Grade school graduate/No formal Education.	a)	a)
b) Middle school graduate.	b)	b)
c) High school graduate.	c)	c)
d) University graduate.	d)	d)
e) Graduate school diploma.	e)	e)

Please choose the occupation of your;

Question Number→	**35.**	**36.**
	MOTHER	FATHER
a) Housewife or Does not work.	a)	a)
b) Retired.	b)	b)
c) Wage earner, Works as an employee.	c)	c)
d) Self-Employed/Business owner/Employer.	d)	d)
e) Other Group/Professional (Lawyer, Doctor, Auditor, Pharmacist etc.)	e)	e)

37. Please circle the option that applies to you. My parents are:

a) Divorced. b) Separated. c) Together. d) Other.

38. Who do you live with?

a) Both of my parents.

b) With my mother.

c) With my father.

d) My parents live out of Istanbul, I live in an apartment/dorm.

e) My parents live in Istanbul, but I live in a separate apartment/dorm.

f) Other

Appendix B

Definition of Steady State Nash Equilibrium and Proofs in Chapter 4

B.1 Definition of Steady State Nash Equilibrium:

Let D(A) be the exogenous distribution of types in the population, in steady state,

$$(*) \qquad p^b = \int_{A_{bi}} \frac{\delta}{\delta + \lambda[\pi \int_{z \in A_{bbi}} F_b(z|A_{bi}) + (1-\pi) \int_{z \in A_{bwi}} F_w(z|A_{bi})]} dD(A_{bi})$$

$$p^w = \int_{A_{wi}} \frac{\delta}{\delta + \lambda[\pi \int_{z \in A_{wbi}} F_b(z|A_{wi}) + (1-\pi) \int_{z \in A_{wwi}} F_w(z|A_{wi})]} dD(A_{wi})$$

$$\pi = \frac{\alpha \cdot p_b}{\alpha \cdot p_b + (1-\alpha) \cdot p_w}$$

Definition B.1: A steady state Nash Equilibrium is characterized by acceptance sets

$\chi = \{A_{bbi}, A_{bwi}, A_{bbj}, A_{wbj}, A_{wwi}, A_{wbi}, A_{wwj}, A_{bwj}\}$ such that, $\beta V(A_{ri})$, $\beta V(A_{rj})$, $\beta K(A_{ri}, A_{r'j})$ and $\beta K(A_{r'i}, A_{rj})$ satisfy equations (4.1), (4.2) and (4.3) for $i, j = 1, ., J$ and $r, r' = b, w$; for all i,j=1,.,J, the following conditions hold: (i) optimal reservation policy: the acceptance sets χ satisfy equation (4.4) and (ii) optimal matching agreement: for r, r' $A_{r'j} \in A_{rr'i}$ and $A_{ri} \in A_{rr'j}$ and (iii) steady state accounting: p_b, p_w and π satisfy (*).

B.2 Proof of Proposition 4.2.1:

Manipulating equation (4.6) I get,

$$\begin{aligned} 0 &= R_{bi} - 2 - \frac{\lambda}{\beta+\delta}\Big\{\pi^* \int_{R_{bi}}^{\overline{A}_{bj}} (z - R_{bi}) dF_b(z|A_{bi}) + \\ &\quad (1-\pi^*) \int_{R'_{bi}}^{\overline{A}_{wj}} (z - R_{bi} - \theta(A_{bi})) dF_w(z|A_{bi})\Big\} \\ 0 &= G(R_{bi}, A_{bi}) \end{aligned}$$

The derivative of the reservation type for a spouse of the same race with respect to one's own educational level is given by: $\frac{dR_{bi}}{dA_{bi}} = -\frac{\partial G}{\partial A_{bi}} / \frac{\partial G}{\partial R_{bi}}$

$$\begin{aligned} \frac{\partial G(R_{bi}, A_{bi})}{\partial A_{bi}} &= \frac{\lambda(1-\pi^*)}{\beta+\delta} \frac{d\theta_i}{dA_{bi}} \int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) < 0 \quad since, \quad \frac{d\theta_i}{dA_{bi}} < 0 \\ \frac{\partial G(R_{bi}, A_{bi})}{\partial R_{bi}} &= 1 + \frac{\lambda}{\beta+\delta}\Big\{\pi^* \int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi}) + (1-\pi^*) \int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})\Big\} > 0 \end{aligned}$$

Therefore, the derivative of the reservation type for a spouse of the same race with respect to one's individual education level is increasing.

$$\frac{dR_{bi}}{dA_{bi}} = -\frac{\frac{\lambda(1-\pi^*)}{\beta+\delta} \frac{d\theta_i}{dA_{bi}} \int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})}{1 + \frac{\lambda}{\beta+\delta}\Big\{\pi^* \int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi}) + (1-\pi^*) \int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})\Big\}} > 0$$

B.3 Proof of Proposition 4.2.2:

$$R'_{bi} = R_{bi} + \theta(A_{bi})$$
$$\frac{dR'_{bi}}{dA_{bi}} = \frac{dR_{bi}}{dA_{bi}} + \frac{d\theta(A_{bi})}{dA_{bi}}$$

Since $\frac{d\theta(A_{bi})}{dA_{bi}} < 0$ unless $\theta(A_{bi}) = 0$, $\frac{dR'_{bi}}{dA_{bi}} < \frac{dR_{bi}}{dA_{bi}}$ always holds. Substituting $\frac{dR_{bi}}{dA_{bi}}$ in the above equation yields

$$\frac{dR'_{bi}}{dA_{bi}} = -\frac{\frac{\lambda(1-\pi^*)}{\beta+\delta}\frac{d\theta_i}{dA_{bi}}\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})}{1+\frac{\lambda}{\beta+\delta}\left\{\pi^*\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi}) + (1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})\right\}} + \frac{d\theta(A_{bi})}{dA_{bi}}$$

$$\frac{dR'_{bi}}{dA_{bi}} = \frac{\frac{d\theta(A_{bi})}{dA_{bi}} + \frac{\lambda}{\beta+\delta}\left\{\pi^*\frac{d\theta(A_{bi})}{dA_{bi}}\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})\right\}}{1+\frac{\lambda}{\beta+\delta}\left\{\pi^*\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi}) + (1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})\right\}} < 0.$$

B.4 Proof of Proposition 4.2.3:

$$Pr(IMP) = \frac{(1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi})}{(1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) + \pi^*\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})}$$

$$\frac{dPr(IMP)}{dA_{bi}} =$$

$$= \frac{\pi^*(1-\pi^*)\left\{\frac{dR_{bi}}{dA_{bi}}f_b(R_{bi})\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) - \frac{dR'_{bi}}{dA_{bi}}f_w(R'_{bi})\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})\right\}}{\left[(1-\pi^*)\int_{R'_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) + \pi^*\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})\right]^2}.$$

Since $\frac{dR'_{bi}}{dA_{bi}} < 0$, the exogamy probability is increasing in education, $\frac{dPr(IMP)}{dA_{bi}} > 0$.

B.5 Proof of Proposition 4.2.4:

Substituting R'_{bi}=R_{bi} and $\theta(A_{bi}) = 0$ in the equation (4.6) and rearranging:

$$\frac{dPr(IMP)}{dA_{bi}} = \frac{\pi^*(1-\pi^*)\frac{dR_{bi}}{dA_{bi}}\left\{f_b(R_{bi})\int_{R_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) - f_w(R_{bi})\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})\right\}}{\left[(1-\pi^*)\int_{R_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) + \pi^*\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})\right]^2}.$$

Define $f_w = f_w(R_{bi}|A_{bi})$, $f_b = f_b(R_{bi}|A_{bi})$ and $dF_w = dF_w(z|A_{bi})$ and $dF_b = dF_b(z|A_{bi})$. Therefore, $\frac{dPr(IMP)}{dA_{bi}} > 0$ if and only if:

$$\begin{aligned}\left\{f_b(R_{bi})\int_{R_{bi}}^{\overline{A}_{wj}} dF_w(z|A_{bi}) - f_w(R_{bi})\int_{R_{bi}}^{\overline{A}_{bj}} dF_b(z|A_{bi})\right\} &> 0 \quad or\\ f_b[1-F_w(R_{bi}|A_{bi})] - f_w[1-F_b(R_{bi}|A_{bi})] &> 0.\end{aligned}$$

Since $F_w(\bullet|A_{bi})$ first order stochastically dominates $F_b(\bullet|A_{bi})$, this implies that $F_w(R_{bi}|A_{bi}) < F_b(R_{bi}|A_{bi})$, while $R_{bi} \in (\underline{A}_b, \overline{A}_b)$. Therefore, $[1-F_w(R_{bi}|A_{bi})] > [1-F_b(R_{bi}|A_{bi})]$ holds when $R_{bi} \in (\underline{A}_b, \overline{A}_b)$. Since the distributions are identical except $\mu_b < \mu_w$, they only cross once at $\kappa = \frac{\mu_b+\mu_w}{2}$. Therefore, as long as $\underline{A}_b < R_{bi} \leq \kappa$, it remains true that $f_b(R_{bi}|A_{bi}) \geq f_w(R_{bi}|A_{bi})$.[1] If A^*_{bi} is such that $\underline{A}_b < R_b(A^*_{bi}) \leq \kappa$, $\frac{dPr(IMP)}{dA_{bi}} > 0$.

[1] Which is more likely given educational levels.

Appendix C

Additional Tables in Chapter 4

Table C.1: Effect of Human Capital on Interracial Marriage for Black Males: Marginal Effects After Probit, Metropolitan Areas (MAs) Incompletely Identified Less Than 10 Percent, Variation in Distributions of Education by MAs and Race

	(1)	**(2)**	**(3)**	**(4)**
edu_{bij}	.0037**	.0036**	−.0072	−.00001
	(.0003)	(.0003)	(.0133)	(.0010)
$\overline{edu}_{bj} \times edu_{bij}$			−.0026*	
			(.0012)	
$\overline{edu}_{wj} \times edu_{bij}$			.0031**	
			(.0007)	
$\overline{edu}_{bj}$			.0445**	
			(.0172)	
$\overline{edu}_{wj}$			−.0284**	
			(.0109)	
$(\overline{edu}_{wj} - \overline{edu}_{bj}) \times edu_{bij}$				.0030**
				(.0007)
$(\overline{edu}_{wj} - \overline{edu}_{bj})$				−.0308**
				(.0110)
σ_{bj}		−.0098	−.0156*	−.0167*
		(.0061)	(.0067)	(.0067)
σ_{wj}		−.0007	−.0263**	-.0075
Population		(.0077)	(.0084)	(.0079)
Total$\times 10^{-5}$		−.0496**	−.0668**	−.0478**
		(.0122)	(.0123)	(.0121)
Black Male		.0001**	.0001**	.0001**
		(.00001)	(.00001)	(.00001)
Black Female		−.0001**	−.0001**	−.0001**
		(.00002)	(.00002)	(.00001)
Black Male Available		−.0001**	−.0001**	−.00008**
		(.00002)	(.00002)	(.00002)
Black Female Available		.0001**	.0001**	.0001**

Table C.1: (continued)

	(1)	(2)	(3)	(4)
Sex Ratio		(.00002)	(.00002)	(.00002)
bm/bf		.0051	.0066	.0024
		(.0058)	(.0060)	(.0060)
bm/wf		$-.1484^{**}$	$-.1317^{**}$	$-.1457^{**}$
		(.0119)	(.0118)	(.0120)
wm/bf		$.0009^{**}$	$.0009^{**}$	$.0010^{**}$
		(.0001)	(.0001)	(.0002)
wm/wf		$.05921^{+}$	$-.0056$	.0454
		(.0301)	(.0307)	(.0302)
Age	$-.0048^{**}$	$-.0045^{**}$	$-.0046^{**}$	$-.0046^{**}$
	(.0012)	(.0011)	(.0011)	(.0011)
Age^2	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$
	(.00001)	(.00001)	(.00001)	(.00001)
North East	$-.0523^{**}$	$-.0254^{**}$	$-.0185^{**}$	$-.0270^{**}$
	(.0016)	(.0030)	(.0035)	(.0030)
Midwest	$-.0466^{**}$	$-.0194^{**}$	$-.0100^{**}$	$-.0199^{**}$
	(.0017)	(.0031)	(.0037)	(.0031)
South	$-.1036^{**}$	$-.0416^{**}$	$-.0282^{**}$	$-.0420^{**}$
	(.0027)	(.0042)	(.0046)	(.0042)
Mean of Dependent	.0741	.0741	.0741	.0741
Predicted Probability(at $\bar{x}$)	.0658	.0603	.0599	.0601
Observations (N)	83,370	83,370	83,370	83,370
Log Pseudo Likelihood	-20,904	-20,179	-20,141	-20,164

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. Metropolitan areas with less than 50 observations in any gender/race cell and the ones incompletely identified by more than 10% were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Table C.2: Effect of Human Capital on Interracial Marriage for Black Males: Marginal Effects After Probit, MAs Incompletely Identified Less Than 10 Percent, Variation in Distributions of Education by MAs, Race and Gender

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
edu_{bij}	$.0036^{**}$	$-.0069$	.0006	.0003	0003
	(.0003)	(.0148)	(.0010)	(.0010)	(.0011)
$\overline{edu}_{bmj} \times edu_{bij}$		.0009			
		(.0019)			
$\overline{edu}_{bfj} \times edu_{bij}$		$-.0037^{+}$			
		(.0022)			
$\overline{edu}_{wmj} \times edu_{bij}$		$-.0050$			
		(.0034)			
$\overline{edu}_{wfj} \times edu_{bij}$		$.0084^{*}$			
		(.0036)			
$\overline{edu}_{bmj}$		.0450			
		(.0278)			
$\overline{edu}_{bfj}$		$-.0038$			
		(.0312)			
$\overline{edu}_{wmj}$		.0275			
		(.0472)			
$\overline{edu}_{wfj}$		$-.0511$			
		(.0502)			
$(\overline{edu}_{wmj} - \overline{edu}_{bmj}) \times edu_{bij}$			$-.0015$	.0382	$-.0045$
			(.0017)	(.0414)	(.0030)
$(\overline{edu}_{wmj} - \overline{edu}_{bmj})$			$-.0182$	.0302	.0382
			(.0243)	(.0382)	(.0414)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj}) \times edu_{bij}$			$.0049^{*}$	$.0079^{*}$	$.0039^{*}$
			(.0020)	(.0032)	(.0021)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj})$			$-.0080$	$-.0665$	.0102
			(.0248)	(.0441)	(.0303)
$(\overline{edu}_{bmj} - \overline{edu}_{bfj}) \times edu_{bij}$				.0040	
				(.0032)	
$(\overline{edu}_{bmj} - \overline{edu}_{bfj})$				$.0768^{+}$	
				(.0443)	
$(\overline{edu}_{bmj} - \overline{edu}_{wfj}) \times edu_{bij}$					$-.0040$
					(.0032)
$(\overline{edu}_{bmj - \overline{edu}_{wfj}}$					$.0768^{+}$
					(.0443)
Mean of Dependent	.0726	.0726	.0726	.0726	.0726
Predicted Probability(at $\bar{x}$)	.0594	.0587	.0590	.0590	.0589
Observations (N)	82,869	82,869	82,869	82,869	82,869
Log Pseudo Likelihood	-19,794	-19,698	-19,723	-19,719	-19,719

Table C.2: (continued)

	(1)	(2)	(3)	(4)	(5)
σ_{bmj}	$-.0213^{**}$	$-.0163^{**}$	$-.0221^{**}$	$-.0190^{**}$	$-.0190^{**}$
	(.0053)	(.0057)	(.0056)	(.0057)	(.0057)
σ_{bfj}	.0091	.0006	.0043	.0035	.0035
	(.0063)	(.0063)	(.0062)	(.0063)	(.0063)
σ_{wmj}	$-.0168$	$-.0471^{**}$	$-.0276^{*}$	$-.0290^{*}$	$-.0290^{*}$
	(.0133)	(.0137)	(.0134)	(.0134)	(.0134)
σ_{wfj}	.0227	$.0356^{*}$	$.0306^{*}$	$.0339^{*}$	$.0339^{*}$
	(.0153)	(.0152)	(.0152)	(.0152)	(.0152)
Population					
Total$\times 10^{-5}$	$-.0548^{**}$	$-.0442^{**}$	$-.0275^{*}$	$-.0291^{*}$	$-.0291^{*}$
	(.0123)	(.0125)	(.0124)	(.0124)	(.0124)
Black Male	$.0002^{**}$	$.0002^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
Black Female	$-.0002^{**}$	$-.0002^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$
	(.00002)	(.00002)	(.00002)	(.00001)	(.00001)
Black Male Available	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$	$-.0001^{**}$
	(.000001)	(.00002)	(.00002)	(.00002)	(.00002)
Black Female Available	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$	$.0001^{**}$
	(.00001)	(.00002)	(.00002)	(.00002)	(.00002)
Sex Ratio					
bm/bf	$.0302^{**}$	$.0536^{**}$	$.0495^{**}$	$.0550^{**}$	$.0550^{**}$
	(.0073)	(.0083)	(.0079)	(.0083)	(.0083)
bm/wf	$-.1147^{**}$	$-.0772^{**}$	$-.0922^{**}$	$-.0878^{**}$	$-.0878^{**}$
	(.0112)	(.0109)	(.0110)	(.0110)	(.0110)
wm/bf	$.0020^{**}$	$.0016^{**}$	$.0017^{**}$	$.0017^{**}$	$.0016^{**}$
	(.0001)	(.0001)	(.0001)	(.0002)	(.0001)
wm/wf	$-.0245$	$-.0871^{**}$	$-.0345$	$-.0479$	$-.0479$
	(.0310)	(.0318)	(.0309)	(.0313)	(.0312)
Age	$-.0046^{**}$	$-.0046^{**}$	$-.0046^{**}$	$-.0045^{**}$	$-.0045^{**}$
	(.0011)	(.0011)	(.0011)	(.0011)	(.0011)
Age^2	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$	$.00003^{*}$
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
North East	$-.0187^{**}$	$-.0097^{*}$	$-.0191^{**}$	$-.0169^{**}$	$-.0169^{**}$
	(.0033)	(.0039)	(.0032)	(.0035)	(.0034)
Midwest	$-.0087^{*}$	.0044	$-.0069^{*}$	$-.0054$	$-.0054$
	(.0034)	(.0041)	(.0033)	(.0035)	(.0035)
South	$-.0268^{**}$	$-.0125^{**}$	$-.0264^{**}$	$-.0247^{**}$	$-.0247^{**}$
	(.0040)	(.0045)	(.0040)	(.0041)	(.0041)

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. Metropolitan areas with less than 50 observations in any gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Table C.3: Current State of Residence: Effect of Human Capital on Interracial Marriage for Black Males, Marginal Effects After Probit, Variation in Distributions of Education by State, Race and Age

	(1)	**(2)**	**(3)**	**(4)**
edu_{bi}	$.0037^{**}$	$.0033^{**}$	.0092	$-.0004$
	(.0003)	(.0002)	(.0114)	(.0011)
$\overline{edu}_{bj} \times edu_{bij}$			$-.0042^{**}$	
			(.0013)	
$\overline{edu}_{wj} \times edu_{bij}$			$.0035^{**}$	
			(.0010)	
$\overline{edu}_{bj}$			$.0828^{**}$	
			(.0175)	
$\overline{edu}_{wj}$			$-.0358^{*}$	
			(.0142)	
$(\overline{edu}_{wj} - \overline{edu}_{bj}) \times edu_{bij}$				$.0039^{**}$
				(.0011)
$(\overline{edu}_{wj} - \overline{edu}_{bj})$				$-.0356^{*}$
				(.0162)
σ_{bj}		$-.0330^{**}$	$-.0239^{**}$	$-.0476^{**}$
		(.0058)	(.0070)	(.0068)
σ_{wj}		$.0240^{**}$	$.0286^{**}$	$.0355^{**}$
		(.0080)	(.0081)	(.0083)
Population				
Total$\times 10^{-5}$		$.0431^{**}$	$.0399^{**}$	$.0444^{**}$
		(.0091)	(.0072)	(.0085)
Black Male		$.00002^{**}$	$.00002^{*}$	$.00001^{*}$
		$(.71\times 10^{-5})$	$(.72\times 10^{-5})$	$(.71\times 10^{-5})$
Black Female		$-.00002^{*}$	$.64\times 10^{-5}$	$-.00001^{*}$
		$(.82\times 10^{-5})$	$(.81\times 10^{-5})$	$(.81\times 10^{-5})$
Black Male Available		$.87 \times 10^{-5}$	$.00003^{**}$	$.31\times 10^{-5}$
		(.00001)	(.00001)	(.00001)
Black Female Available		$.24 \times 10^{-5}$	$.00005^{**}$	$.47\times 10^{-5}$
		(.00001)	(.00001)	(.00001)
			(.396)	

Table C.3: (continued)

	(1)	(2)	(3)	(4)
Sex Ratio				
bm/bf		.0193	.0054	$-.0207^{+}$
		(.0123)	(.0120)	(.0121)
bm/wf		$-.0787^{**}$	$-.0797^{**}$	$-.0981^{**}$
		(.0191)	(.0123)	(.0157)
wm/bf		$.0012^{**}$	$.0011^{**}$	$.0012^{**}$
		(.0001)	(.0001)	(.0001)
wm/wf		.0141	$.0862^{*}$	.0279
		(.0431)	(.0398)	(.0429)
Age	$-.0042^{**}$	$-.0052^{**}$	$-.0036^{**}$	$-.0044^{**}$
	(.0009)	(.0011)	(.0010)	(.0010)
Age^2	$.00002^{+}$	$.00003^{*}$	.00001	$.00002^{+}$
	(.00001)	(.00001)	(.00001)	(.00001)
North East	$-.0452^{**}$	$-.0265^{**}$	$-.0179^{**}$	$-.0291^{**}$
	(.0015)	(.0029)	(.0033)	(.0027)
Midwest	$-.0369^{**}$	$-.0197^{**}$	$-.0039$	$-.0169^{**}$
	(.0016)	(.0029)	(.0037)	(.0031)
South	$-.1198^{**}$	$-.0347^{**}$	$-.0132^{**}$	$-.0308^{**}$
	(.0029)	(.0044)	(.0044)	(.0045)
Mean of Dependent	.0714	.0714	.0714	.0714
Predicted Probability(at $\bar{x}$)	.0616	.0570	.0559	.0567
Observations (N)	110,373	110,373	110,373	110,373
Log Pseudo Likelihood	-26,697	-25,927	-25,846	-25,903
F-Stat:				
$\overline{edu}_{wj} = -\overline{edu}_{bj}$			14.22^{**}	
			(.000)	
$\overline{edu}_{wj} \times edu_{bij} = -\overline{edu}_{bj} \times edu_{bij}$			0.72	
			(.396)	

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. States with less than 50 observations in any age/gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Table C.4: Current State of Residence: Effect of Human Capital on Interracial Marriage for Black Males, Marginal Effects After Probit, Variation in Distributions of Education by State, Race, Age and Gender

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
edu_{bi}	.0032**	.0024	−.0005	−.0007	−.0007
	(.0003)	(.0127)	(.0010)	(.0011)	(.0011)
$\overline{edu}_{bmj} \times edu_{bij}$		−.0031			
		(.0019)			
$\overline{edu}_{bfj} \times edu_{bij}$		−.0002			
		(.0027)			
$\overline{edu}_{wmj} \times edu_{bij}$		.0027			
		(.0015)			
$\overline{edu}_{wfj} \times edu_{bij}$		.0008			
		(.0020)			
$\overline{edu}_{bmj}$		.0724**			
		(.0279)			
$\overline{edu}_{bfj}$		−.0117			
		(.0384)			
$\overline{edu}_{wmj}$		−.0273			
		(.0224)			
$\overline{edu}_{wfj}$		.0020			
		(.0292)			
$(\overline{edu}_{wmj} - \overline{edu}_{bmj}) \times edu_{bij}$			.0024+	.0022	.0022
			(.0014)	(.0015)	(.0015)
$(\overline{edu}_{wmj} - \overline{edu}_{bmj})$			−.0370+	−.0125	−.0125
			(.0214)	(.0225)	(.0225)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj}) \times edu_{bij}$			.0011	.0011	.0002
			(.0022)	(.0021)	(.0025)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj})$			.0114	−.0137	.0400
			(.0315)	(.0308)	(.0368)
$(\overline{edu}_{bmj} - \overline{edu}_{bfj}) \times edu_{bij}$				−.0009	
				(.0017)	
$(\overline{edu}_{bmj} - \overline{edu}_{bfj})$				.0537*	
				(.0255)	
$(\overline{edu}_{bmj} - \overline{edu}_{wfj}) \times edu_{bij}$					−.0009
					(.0017)
$(\overline{edu}_{bmj} - \overline{edu}_{wfj})$					.0537*
					(.0255)
Mean of Dependent	.0711	.0711	.0711	.0711	.0711
Predicted Probability(at $\bar{x}$)	.0567	.0557	.0564	.0563	.0563
Observations (N)	110,233	110,233	110,233	110,233	110,233
Log Pseudo Likelihood	-25,798	-25,720	-25,769	-25,756	-25,756

Table C.4: (continued)

	(1)	(2)	(3)	(4)	(5)
σ_{bmj}	$-.0216^{**}$	$-.0108$	$-.0286^{**}$	$-.0204^{**}$	$-.0203^{**}$
	(.0063)	(.0073)	(.0070)	(.0072)	(.0072)
σ_{bfj}	$-.0213^{**}$	$-.0181^{**}$	$-.0245^{**}$	$-.0204^{**}$	$-.0304^{**}$
	(.0063)	(.0064)	(.0063)	(.0064)	(.0065)
σ_{wmj}	$.0312^{*}$	$-.0068^{**}$	.0109	$-.0037$	.0037
	(.0136)	(.0141)	(.0139)	(.0140)	(.0140)
σ_{wfj}	.0011	$.0581^{**}$	$.0427^{*}$	$.0522^{**}$	$.03522^{**}$
	(.0160)	(.0177)	(.0175)	(.0176)	(.0176)
Population					
Total$\times 10^{-5}$	$.0468^{**}$	$.0434^{**}$	$.0509^{**}$	$.0469^{**}$	$.0469^{**}$
	(.0087)	(.0070)	(.0081)	(.0075)	(.0075)
Black Male	$.00001^{*}$	$.99.10^{-5}$	$.0001^{**}$	$.98.10^{-5}$	$.98.10^{-5}$
	$(.72.10^{-5})$	$(.72.10^{-5})$	$(.71.10^{-5})$	$(.71.10^{-5})$	$(.71.10^{-5})$
Black Female	$-.00002^{*}$	$.42.10^{-5}$	$-.00001^{**}$	$-.00001^{+}$	$-.00001^{+}$
	$(.84.10^{-5})$	$(.85.10^{-5})$	$(.83.10^{-5})$	$(.84.10^{-5})$	$(.84.10^{-5})$
Black Male Available	$-.00001$	$.00002^{+}$	$-.00001$	$.41.10^{-5}$	$.41.10^{-5}$
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
Black Female Available	$.94.10^{-5}$	$-.00003^{*}$	$(.39.10^{-5})$	$.30.10^{-5}$	$.30.10^{-5}$
	(.00001)	(.00001)	(.00002)	(.00001)	(.00001)
Sex Ratio					
bm/bf	$.0389^{**}$	$.0345^{*}$	$.0412^{**}$	$.0448^{**}$	$.0448^{**}$
	(.0142)	(.0141)	(.0142)	(.0142)	(.0142)
bm/wf	$-.0652^{**}$	$-.0880^{**}$	$-.0970^{**}$	$-.0935^{**}$	$-.0936^{**}$
	(.0179)	(.0117)	(.0146)	(.0135)	(.0135)
wm/bf	$.0017^{**}$	$.0013^{**}$	$.0016^{**}$	$.0015^{**}$	$.0015^{**}$
	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)
wm/wf	.0159	$.1514^{**}$	.0506	$.0926^{*}$	$.0926^{8}$
	(.0458)	(.0439)	(.0457)	(.0458)	(.0458)
Age	$-.0058^{**}$	$-.0025^{**}$	$-.0043^{**}$	$-.0027^{*}$	$-.0027^{**}$
	(.0010)	(.0011)	(.0011)	(.0012)	(.0011)
Age^2	$.00004^{**}$	$.95\times 10^{-6}$	$.00002^{+}$	$.95 \times 10^{-5}$	$.94 \times 10^{-5}$
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
Northeast	$-.0232^{**}$	$-.0130^{**}$	$-.0264^{**}$	$-.0194^{**}$	$-.0194^{**}$
	(.0031)	(.0039)	(.0030)	(.0036)	(.0036)
Midwest	$-.0162^{**}$	.0025	$-.0119^{**}$	$-.0074^{+}$	$-.0074^{+}$
	(.0032)	(.0041)	(.0034)	(.0037)	(.0037)
South	$-.0292^{**}$	$-.0073^{+}$	$-.0248^{**}$	$-.0183^{**}$	$-.0182^{**}$
	(.0045)	(.0045)	(.0045)	(.0046)	(.0046)

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. States with less than 50 observations in any age/gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Table C.5: Birth State: Effect of Human Capital on Interracial Marriage for Black Males, Marginal Effects After Probit, Variation in Distributions of Education by State, Race and Age

	(1)	**(2)**	**(3)**	**(4)**
edu_{bij}	.0037**	.0033**	.0165	.00001
	(.0003)	(.0003)	(.0137)	(.0009)
$\overline{edu}_{bj} \times edu_{bij}$			−.0052**	
			(.0015)	
$\overline{edu}_{wj} \times edu_{bij}$			.0039**	
			(.0011)	
$\overline{edu}_{bj}$			.0808**	
			(.0219)	
$\overline{edu}_{wj}$			−.0548**	
			(.0155)	
$(\overline{edu}_{wj} - \overline{edu}_{bj}) \times edu_{bij}$				.0040**
				(.0011)
$(\overline{edu}_{wj} - \overline{edu}_{bj})$				−.0558**
				(.0156)
σ_{bj}		−.0143+	−.0107	−.0119
		(.0075)	(.0081)	(.0080)
σ_{wj}		.0212*	.0205*	.0185*
		(.0088)	(.0092)	(.0092)
Population				
Total$\times 10^{-5}$		.0051	−.0003	.0043
		(.0052)	(.0059)	(.0051)
Black Male		.00002*	.00003*	.00002*
		(.00001)	(.00001)	(.00001)
Black Female		−.00002*	−.00002*	−.00002+
		(.00001)	(.00001)	(.00001)
Black Male Available		−.00002+	−.00003*	−.00003*
		(.00001)	(.00001)	(.00001)
Black Female Available		.00001	.00001	.00001
		(.00001)	(.00001)	(.00001)
Mean of Dependent	.0733	.0733	.0733	.0733
Predicted Probability(at $\bar{x}$)	.0618	.0601	.0599	.0600
Observations (N)	98,453	98,453	98,453	98,453
Log Pseudo Likelihood	-26,779	-23,801	-23,793	-23,794
F-Stat:				
$\overline{edu}_{wj} = -\overline{edu}_{bj}$			2.79+	
			(.094)	
$\overline{edu}_{wj} \times edu_{bij} = -\overline{edu}_{bj} \times edu_{bij}$			1.42	
			(.232)	

Table C.5: (continued)

	(1)	(2)	(3)	(4)
Sex Ratio				
bm/bf		.0216	.0288^{+}	.0228
		(.0159)	(.0163)	(.0159)
bm/wf		−.0257**	−.0257**	−.0252**
		(.0072)	(.0070)	(.0072)
wm/bf		.0005**	.0005**	.0005**
		(.00007)	(.00007)	(.00007)
wm/wf		.0678	.0613	.0666
		(.0616)	(.0611)	(.0615)
Age	−.0041**	−.0032**	−.0032**	−.0032**
	(.0009)	(.0012)	(.0011)	(.0012)
Age^2	.00002^{+}	$.79 \times 10^{-5}$	$.73 \times 10^{-5}$	$.82 \times 10^{-5}$
	(.00001)	(.00001)	(.00001)	(.00001)
North East	−.0449**	−.0326**	−.0318**	−.0322**
	(.0015)	(.0019)	(.0020)	(.0020)
Midwest	−.0372**	−.0382**	−.0380**	−.0384**
	(.0017)	(.0017)	(.0017)	(.0017)
South	−.1207**	−.1044**	−.1038**	−.1043**
	(.0029)	(.0035)	(.0035)	(.0035)
Mean of Dependent	.0733	.0733	.0733	.0733
Predicted Probability(at $\bar{x}$)	.0618	.0601	.0599	.0600
Observations (N)	98,453	98,453	98,453	98,453
Log Pseudo Likelihood	-26,779	-23,801	-23,793	-23,794
F-Stat:				
$\overline{edu}_{wj} = -\overline{edu}_{bj}$			2.79^{+}	
			(.094)	
$\overline{edu}_{wj} \times edu_{bij} = -\overline{edu}_{bj} \times edu_{bij}$			1.42	
			(.232)	

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. States with less than 50 observations in any age/gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels.

Table C.6: Birth State: Effect of Human Capital on Interracial Marriage for Black Males, Marginal Effects After Probit, Variation in Distributions of Education by State, Race, Age and Gender

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
edu_{bij}	.0033**	.0199	−.0001	−.0001	−.0001
	(.0003)	(.0147)	(.0010)	(.0013)	(.0013)
$\overline{edu}_{bmj} \times edu_{bij}$		−.0030			
		(.0031)			
$\overline{edu}_{bfj} \times edu_{bij}$		−.0021			
		(.0035)			
$\overline{edu}_{wmj} \times edu_{bij}$		.0031			
		(.0019)			
$\overline{edu}_{wfj} \times edu_{bij}$		.0004			
		(.0023)			
$\overline{edu}_{bmj}$		.0918*			
		(.0428)			
$\overline{edu}_{bfj}$		−.0157			
		(.0494)			
$\overline{edu}_{wmj}$		−.0729*			
		(.0285)			
$\overline{edu}_{wfj}$		.0265			
		(.0336)			
$(\overline{edu}_{wmj} - \overline{edu}_{bmj}) \times edu_{bij}$			.0025	.0025	.0025
			(.0018)	(.0018)	(.0018)
$(\overline{edu}_{wmj} - \overline{edu}_{bmj})$			−.0722**	−.0611*	−.0611*
			(.0261)	(.0273)	(.0273)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj}) \times edu_{bij}$			.0013	.0013	.0014
			(.0022)	(.0022)	(.0035)
$(\overline{edu}_{wfj} - \overline{edu}_{bfj})$			.0253	.0116	.0309
			(.0313)	(.0323)	(.0483)
$(\overline{edu}_{bmj} - \overline{edu}_{bfj}) \times edu_{bij}$				.00007	
				(.0027)	
$(\overline{edu}_{bmj} - \overline{edu}_{bfj})$				.0193	
				(.0394)	
$(\overline{edu}_{bmj} - \overline{edu}_{wfj}) \times edu_{bij}$					.00007
					(.0027)
$(\overline{edu}_{bmj} - \overline{edu}_{wfj})$					.0193
					(.0394)
Mean of Dependent	.0732	.0732	.0732	.0732	.0732
Predicted Probability(at $\bar{x}$)	.0600	.0597	.0598	.0598	.0598
Observations (N)	98,350	98,350	98,350	98,350	98,350
Log Pseudo Likelihood	-23,736	-23,712	-23,716	-23,714	-23,714

Table C.6: (continued)

	(1)	(2)	(3)	(4)	(5)
σ_{bmj}	.0243**	.0399**	.0366**	.0397**	.0397**
	(.0069)	(.0075)	(.0073)	(.0075)	(.0075)
σ_{bfj}	−.0431**	−.0467**	−.0455**	−.0489**	−.0488**
	(.0080)	(.0083)	(.0080)	(.0082)	(.0082)
σ_{wmj}	−.0008	.0025	.0058	.0068	.0068
	(.0135)	(.0137)	(.0130)	(.0132)	(.0132)
σ_{wfj}	.0233	.0236	.0171	.0164	.0163
	(.0154)	(.0165)	(.0153)	(.0155)	(.0155)
Population					
Total×10^{-5}	.0050	.0060	.0120*	.0098+	.0098+
	(.0053)	(.0063)	(.0055)	(.0056)	(.0056)
Black Male	.00001	.00001	.00001	.00001	.00001
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
Black Female	−.00001	−.00001	−.00002	−.00001	−.00001
	(.000001)	(.00001)	(.00002)	(.00001)	(.00001)
Black Male Available	−.00003+	−.00003*	−.00003**	−.00003*	−.00003*
	(.00001)	(.00001)	(.00001)	(.00001)	(.00001)
Black Female Available	.00001	.00002	.00003+	.00002	.00002
	(.00001)	(.00002)	(.00002)	(.00002)	(.00002)
Sex Ratio					
bm/bf	.0730**	.0938**	.0813**	.0893**	.0893**
	(.0282)	(.0284)	(.0282)	(.0283)	(.0283)
bm/wf	−.0239**	−.0259**	−.0275**	−.0254**	−.0254**
	(.0071)	(.0075)	(.0076)	(.0075)	(.0075)
wm/bf	.0005**	.0005**	.0005**	.0005**	.0005**
	(.00008)	(.00008)	(.00008)	(.0008)	(.00008)
wm/wf	.0761	.0564	.0671	.0653	.0653
	(.0647)	(.0635)	(.0635)	(.0634)	(.0634)
Age	−.0041**	−.0039**	−.0044**	−.0040**	−.0040**
	(.0012)	(.0012)	(.0012)	(.0012)	(.0012)
Age^2	.00002	.00001	.00003+	.00002	.00002
	(.00002)	(.00001)	(.00001)	(.00002)	(.00002)
North East	−.0325**	−.0324**	−.0331**	−.0325**	−.0326**
	(.0019)	(.0020)	(.0020)	(.0021)	(.0021)
Midwest	−.0372**	−.0371**	−.0374**	−.0373**	−.0373*
	(.0017)	(.0018)	(.0017)	(.0018)	(.0018)
South	−.1032**	−.1038**	−.1044**	−.1042**	−.1042**
	(.0035)	(.0036)	(.0036)	(.0036)	(.0036)

Source: 5 percent IPUMS, 2000 U.S. Census Data Set. The sample is restricted to the non-Hispanic blacks and whites aged 25-54. States with less than 50 observations in any age/gender/race cell were omitted. The entries are in this table are the marginal effects after probit. Census weights are employed. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. **, * and + indicate respectively 1%, 5% and 10% significance levels.

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Vita

Deniz Gevrek, the third and youngest daughter of Orhan Gevrek and Naciye Çakıroğlu, was born in İzmir, Turkey in December 1980. She spent a very happy childhood with her parents and twin sisters Gülşen Sevi Gevrek and Zahide Eylem Gevrek in Kuşadası. After attending Kuşadası Kaya Aldoğan Lisesi and İzmir Kız Lisesi, she graduated from Ankara Çankaya Lisesi in 1998. She was admitted to Boğaziçi (Bosphorus) University in the fall of 1998 as an economics major. After receiving her B.A. degree from Boğaziçi (Bosphorus) University in June 2003, she entered the Graduate School of the University of Texas. She is married to Antonio Jose Martinez Arocha in June 2007.

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This dissertation was typeset with LaTeX[†] by the author.

[†]LaTeX is a document preparation system developed by Leslie Lamport as a special version of Donald Knuth's TeX Program.